FH/YHSC0101032AUEN

IBAS110A MSTP Equipment

User Manual

FiberHome Telecommunication Technologies Co., Ltd.

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Contents

Foreword XI
Intended Audience XI
Framework Structure XI
Operation Security Rules XII
Copyright Information XIII
1 Equipment Overview 1-1
1.1 Overview of MSTP Technology 1-1
1.2 Characteristics of IBAS110A Equipment 1-1
2 Outline Description and Equipment Principles 2-1
2.1 Mechanism of Whole Equipment 2-1
2.2 Front Panel 2-4
2.3 Rear Panel 2-6
2.4 Side Panel 2-13
2.5 Equipment Working Principles 2-13
2.5.1 Function Description of System Card 2-19
2.5.2 Function Description of Extension Card 2-29
3 Equipment Installation 3-1
3.1 Affairs before Installation 3-1
3.2 Equipment Installation 3-1
3.3 Equipment Start-up 3-11
4 Network Management 4-1
4.1 155Mbit/s System Card（S155） 4-2
4.1.1 S155 Card Configuration 4-2
4.1.2 S155 Card Control Command 4-27
4.1.3 SMU Card Configuration 4-29

4.1.4 SMU Card Control Command 4-31
4.2 155Mbit/s Optical Interface Card（O155） 4-32
4.2.1 Card Configuration 4-32
4.2.2 Card Control Command 4-42
4.3 4-Channel Fast Ethernet Switch Transparent Transmission Card（ESD1） 4-43
4.3.1 Card Configuration 4-44
4.3.2 Control Command 4-69
4.4 4-Channel Ethernet Switch Card（ESW4） 4-70
4.4.1 Card Configuration 4-70
4.4.2 Control Command 4-82
4.5 4-Channel Ethernet Transparent Transmission Card（ETH4） 4-83
4.5.1 Card Configuration 4-84
4.5.2 Control Command 4-89
4.6 2Mbit/s Interface Card（E1） 4-90
4.6.1 Card Configuration 4-91
5 Cross-Connect GUI 5-1
5.1 Cross-Connect Setting GUI and Description 5-4
5.2 Common Steps for Cross-Connect Processing 5-8
5.3 Cross-Connect Characteristics of IBAS110A Equipment 5-9
6 Equipment Performance Specification 6-1
6.1 STM-1/STM-4 Optical Interface Performance Specification 6-1
6.2 2Mbit/s Electrical Interface Characteristic 6-5
6.3 Jitter and Wander Performance 6-6
6.4 Error Performance 6-12
7 Equipment Maintenance 7-1
7.1 Equipment Daily Maintenance 7-1
7.1.1 Precautions of Equipment Maintenance 7-1
7.1.2 Equipment Daily Maintenance 7-2

7.2 Analysis of Constant Fault.....7-4

7.3 Troubleshooting.....7-9

7.3.1 Troubleshooting Flow 7-9

7.3.2 Thought of Alarm Point Location.....7-11

7.3.3 Card Replacement.....7-12

Figures

Figure 2-1 IBAS110A equipment outline 2-2
Figure 2-2 IBAS110A equipment whole structure 2-3
Figure 2-3 Front panel of IBAS110A equipment 2-4
Figure 2-4 RJ45 front view（F interface） 2-6
Figure 2-5 Definition of order wire interface pin 2-6
Figure 2-6 Rear panel of IBAS110A equipment 2-7
Figure 2-7 -48V power module 2-7
Figure 2-8 +24V power module 2-8
Figure 2-9 220V power module 2-8
Figure 2-10 Socket pin definition of various interfaces 2-10
Figure 2-11 Whole structure of IBAS110A equipment 2-14
Figure 2-12 Working principle of 2Mbit/s interface card 2-30
Figure 2-13 2Mbit/s interface card 2-30
Figure 2-14 Working principle of low level Ethernet interface card 2-31
Figure 2-15 Panel of low level Ethernet interface card 2-32
Figure 2-16 Working principle of Ethernet card 2-33
Figure 2-17 Ethernet card panel 2-34
Figure 2-18 STM-1 optical interface card principle 2-35
Figure 2-19 STM-1 optical interface card panel 2-36
Figure 2-20 PDH optical branch principle 2-38
Figure 2-21 PDH optical branch card panel 2-40
Figure 3-1 220V AC power module 3-3
Figure 3-2 -48V/+24V DC power module 3-3
Figure 3-3 2Mbit/s interface plug module（including 75Ω,120Ω） 3-5
Figure 3-4 75Ω-2Mbit/s interface plug connection pins 3-6

Figure 3-5 120Ω-2Mbit/s interface plug connection pins....3-8
Figure 4-1 Basic configuration window of S155 card....4-2
Figure 4-2 Clock unit configuration window of S155 card....4-4
Figure 4-3 Clock output enable configuration....4-6
Figure 4-4 Configuration mode 1of SSM threshold....4-7
Figure 4-5 Configuration mode 2 of SSM threshold....4-7
Figure 4-6 Configuration mode 1 with QL-Use- SA -Select....4-9
Figure 4-7 Configuration mode 2 with QL –Use- SA -Select....4-9
Figure 4-8 Configuration mode 1 of Input- Source- QL -Value....4-10
Figure 4-9 Configuration mode 2 of Input- Source- QL- Value....4-11
Figure 4-10 Configuration mode 1 of Output -Source –QL- Value....4-12
Figure 4-11 Configuration mode 2 of Output -Source –QL- Value....4-12
Figure 4-12 Configuration mode 1 of Clock- Input- Source- Wait –Resume- Time....4-13
Figure 4-13 Configuration mode 2 of Clock- Input- Source- Wait- Resume- Time....4-14
Figure 4-14 Configuration window of S155 card EOW unit....4-14
Figure 4-15 Configuration mode 1 of Eow- Port....4-15
Figure 4-16 Configuration mode 2 of EOW-Port....4-16
Figure 4-17 Configuration mode 1 of E2- Data -Access....4-17
Figure 4-18 Configuration mode 2 of E2- Data -Access....4-17
Figure 4-19 Configuration mode 1 of F1- Data- Access....4-18
Figure 4-20 Configuration mode 2 of F1- Data -Access....4-18
Figure 4-21 Circuit unit configuration window....4-19
Figure 4-22 S155 card control command window....4-27
Figure 4-23 SMU card configuration window....4-29
Figure 4-24 Alarm- Set....4-30
Figure 4-25 SMU card control command window....4-31
Figure 4-26 O155 card basic configuration window....4-32
Figure 4-27 Special configuration 1 window of O155 card....4-34

Figure 4-28 VC4 –Payload- Type configuration 4-35
Figure 4-29 Configuration mode 1 of Trib-Mask 4-36
Figure 4-30 Configuration mode 2 of Trib- Mask 4-36
Figure 4-31 Configuration mode 1 of ID-Param -C2 4-37
Figure 4-32 Configuration mode 2 of ID-Param -C2 4-37
Figure 4-33 Trib- J0 setting 4-38
Figure 4-34 Trib- J1 setting 4-38
Figure 4-35 PM- Threshold configuration 4-39
Figure 4-36 Configuration mode 1 of HP-AIS-Generate- Condition 4-40
Figure 4-37 Configuration mode 2 of HP-AIS-Generate- Condition 4-40
Figure 4-38 Special- Config 2 window of O155 card 4-41
Figure 4-39 O155 card control command window 4-42
Figure 4-40 ESD1 card basic configuration window 4-44
Figure 4-41 Configuration mode 1 of path J1 4-46
Figure 4-42 Configuration mode 2 of path J1 4-47
Figure 4-43 J2 –of -WAN -Port setting 4-48
Figure 4-44 LAN- Port –Mask- Setting 4-48
Figure 4-45 WAN –Port- Mask- Setting 4-49
Figure 4-46 Port- Switch setting 4-50
Figure 4-47 FE- Eth -Capsulation setting 4-50
Figure 4-48 FE-WAN-Port –Map -Mode setting 4-51
Figure 4-49 FE-WAN –Port -GFP -Capsulation FCS setting 4-52
Figure 4-50 FE-WAN-Port- LCAS setting 4-52
Figure 4-51 FE-WAN-Port- Time- Slot- Setting 4-53
Figure 4-52 ESD1 card switch configuration window 4-54
Figure 4-53 Port –Work- Mode setting 4-55
Figure 4-54 Port-Receive-Frame-Type setting 4-56
Figure 4-55 Port- PVID- Setting 4-57

Figure 4-56 Port- vMAN -Setting 4-58
Figure 4-57 VLAN configuration window of ESD1 card 4-60
Figure 4-58 Broadcast- Storm- Restrain window of ESD1 card 4-64
Figure 4-59 Static –Unicast – Address-Setting window of ESD1 card 4-66
Figure 4-60 ESD1 card Static Group-Cast-Address-Setting window 4-67
Figure 4-61 Layer2 –Flow -Config window of ESD1 card 4-68
Figure 4-62 ESD1 card control command window 4-69
Figure 4-63 Basic- Config window of ESW4 card 4-71
Figure 4-64 Configuration mode 1 of Trib-Mask 4-73
Figure 4-65 Configuration mode 2 of Trib-Mask 4-74
Figure 4-66 Trib- Switch setting 4-74
Figure 4-67 Trib- Mode- Set 4-75
Figure 4-68 Time -Slot –Set of tributary 4-76
Figure 4-69 PM-Threshold- Set 4-77
Figure 4-70 Port setting 4-78
Figure 4-71 Address-Study setting 4-78
Figure 4-72 Work- Mode setting 4-79
Figure 4-73 Flow- Control setting 4-79
Figure 4-74 Privilege setting 4-80
Figure 4-75 Static MAC- Address configuration 4-80
Figure 4-76 VLAN- Config window of ESW4 card 4-81
Figure 4-77 Control command window of ESW4 card 4-82
Figure 4-78 ETH4 card configuration window 4-84
Figure 4-79 Configuration mode 1 of Trib- Mask 4-86
Figure 4-80 Configuration mode 2 of Trib- Mask 4-86
Figure 4-81 Trib- Switch setting 4-87
Figure 4-82 Trib- Mode- Set 4-87
Figure 4-83 Time- Slot -Set of tributary 4-88

Figure 4-84 PM –Threshold- Set 4-88
Figure 4-85 ETH4 card control command window 4-89
Figure 4-86 E1 card basic configuration window 4-91
Figure 4-87 E1 card Specified configuration window 4-93
Figure 4-88 Channel -Enable setting 4-93
Figure 4-89 Special- config 2 window of E1 card 4-94
Figure 4-90 Configuration mode 1 of (tributary) N2 4-94
Figure 4-91 Configuration mode 2 of (tributary) N2 4-95
Figure 4-92 Trib- Mask setting 4-95
Figure 4-93 Trib- Signal- Setting 4-96
Figure 4-94 Trib- Quiped setting 4-97
Figure 5-1 Cross-connect GUI of IBAS110A equipment 5-3
Figure 5-2 Cross-connect setting GUI 1 5-4
Figure 6-1 Jitter and wander tolerance of STM-1/STM-4 interfaces 6-7
Figure 6-2 Jitter and wander tolerance of 2Mbit/s input interface 6-9
Figure 6-3 Measure configuration of 2Mbit/s output jitter 6-11
Figure 7-1 Troubleshooting flow 7-10

Tables

Table 2-1 Description of system card panel connector 2-4
Table 2-2 LED description 2-5
Table 2-3 Rear panel connector 2-8
Table 2-4 Terminal definition（refer to equipment for output/input） 2-11
Table 2-5 Card types 2-16
Table 2-6 E1 Interface configuration methods 2-21
Table 2-7 Clock reference source definition 2-23
Table 2-8 Clock unit configuration method 2-24
Table 2-9 Configuration methods of K3, K4, K5 2-25
Table 2-10 PDH 2Mbit/s interface configuration 2-37
Table 3-1 75Ω connection wire modules 3-9
Table 3-2 120Ω connection wire module 3-10
Table 6-1 STM-1 optical interface parameter index 6-2
Table 6-2 STM-4 optical interface parameter index 6-4
Table 6-3 2Mbit/s input interface specification 6-5
Table 6-4 2Mbit/s output interface specification 6-6
Table 6-5 Jitter and wander tolerance parameter of STM-1/STM-4 input interface 6-8
Table 6-6 Jitter generation specifications at STM-1/ STM -4 interface 6-8
Table 6-7 Jitter and wander tolerance parameter of 2Mbit/s input interface 6-10
Table 6-8 Output wander of 2Mbit/s interface 6-10
Table 6-9 Combination jitter index 6-12
Table 6-10 Map jitter indexes 6-12

Foreword

Thanks a lot for purchasing our products. We try our best to provide you with product manuals, convenient for your study and easy to understand, so as to help your work and bring you most convenience.

Intended Audience

This manual introduces outline, function characteristics, operation principle, performance specification, start-up and maintenance of IBAS110A equipment produced by FiberHome Telecommunication Co., Ltd.

Framework Structure

The framework structure of this manual is as follows:

1 Equipment overview

Briefly introduces this equipment, including basic theory of MSTP, main function characteristics of IBAS110A equipment.

2 Outline description and equipment principles

Describes outline of this equipment, including front, rear, side panels, LEDs, interfaces, etc., as well as operation principles of this equipment.

3 Equipment installation

Introduces equipment installation methods and preparation and precautions .

4 Network management

Introduces equipment management methods through OTNM2000.

5 Cross-connect GUI

Introduces OTNM2000 cross-connect GUI and special cross-connect configuration of this equipment.

6 Equipment technical specifications

Introduces technical specifications of IBAS110A equipment,including STM-1/STM-4 optical interface, Ethernet interface, E1 electrical interface, jitter and wander specifications, error performance, etc.

7 Equipment maintenance

Introduces daily maintenance ,fault troubleshooting and ordinary fault analysis of this equipment.

Operation Security Rules

- Laser lamp with strong power is harmful to human body, especially to eyes. It's forbidden to take the end face of pigtail fiber of optical transmitter or the end face of its removable connector toward eyes directly.
- Optical communication equipment must be protected from strong electricity and thunder and lightning. Especially when it's necessary to connect the optical cable with the equipment, effective measures should be taken to avoid introducing strong electricity and thunder and lightning into the equipment.
- When using this equipment, users should pay attention to necessary moistureproof measures and avoid water entrance srtictly.Water entrance shall bring abnormal working status of equipment as well as short fault that can lead to other hazards.
- Take care not to bend fiber. If necessary, the fiber bending radius should not be less than 38mm.

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1 Equipment Overview

This chapter mainly introduces the following aspects of IBAS110A equipment of FiberHome:

- Overview of MSTP technology
- Characteristics of IBAS110A equipment

1.1 Overview of MSTP Technology

MSTP is an integrated transmission equipment based on SDH transmission platform that has multi-service functions such as Ethernet and TDM etc. It can perform distribution and transmission functions of multiple services such as TDM and Ethernet services. At the same time, the network management system can be used to carry out management functions such as configuration, fault, performance, security, and account etc. MSTP equipment can be used to form multi-service transmission network and establish a telecommunication network with convergence service, efficient transfer and easy maintenance. So MSTP has been used widely at different network domains of telecommunication network.

1.2 Characteristics of IBAS110A Equipment

IBAS110A Equipment is an MSTP transmission equipment for application at edge network whose line interface is STM-1 or STM-4. It uses highly compact design with the height of only 2U and maintains flexibility. It can provide two extension cards to meet

demands of network adjustment. Its main characteristics are described as follows:

- **Line interface and access capacity**

It supports standard STM-1/STM-4 optical interface, frame structure and basic functions.

It supports 2 STM-1 optical interfaces. Equipment can be upgraded to STM-4 through using STM-4 system cards which support 2 STM-4 optical interfaces.

The total access capability of this equipment is 64 channels of E1, among which 32 channels of E1 are provided by system card.

Its total Ethernet (10/100Mbit/s） access capability is 16, with system cards (only S622E8 and S155E8 system cards) supporting 8.

The total access capability of STM-1 optical tributary of this equipment is 2 and PDH optical tributary access capability is 4.

- User interface

It supports all defined overhead bytes. E1 byte is used for providing one channel of order wire; E2 and F1 bytes are used for providing four channels of data interfaces with rate < 9.6kbit/s. Supports RS232 interface.

- Various management interfaces

Provides F and f （f/Debug）interfaces. The F interface is connected with network management server, which uses standard Ethernet communication protocols and processes management information from server. The f interface is connected with PC and uses RS232 interface. When management network is not established, and equipment needs maintenance, f interface can also be used for equipment debugging and maintenance. At the same time, one

channel of RS485 interface is provided for management for other access equipments of FiberHome. For application in transferring the networking management through equipments of other manufacturers, F2 channel can be used as DCC channel for transferring network management information.

- **Clock interfaces**

IBAS110A equipment provides 2 ports of 2Mbit/s（supporting SSM function）or 2MHz external clock interfaces. Adaptation of 2Mbit/s, 2MHz is performed with setting inside system card. 9-pin D type connector is used as the physical interface.

The timing system of this equipment can work under one of the following three conditions: locking up mode, hold-over mode, free running mode. The equipment reference timing source can be selected from external clock reference input, line reference input and tributary reference input (including STM-1 tributary and E1 tributary).

- **Networking ability of various topologies**

It can support multiple network topologies, such as ring, chain, T-type (at most supporting 2 optical tributaries or 4 PDH optical tributaries). It can also act as remote end of other equipments ,i.e. service extension of high level equipment.

- **Protection mechanism**

When configured as STM-1 equipment, it can provide path protection. When configured as STM-4 equipment, this equipment is able to provide path protection, line protection and 2-fiber multiplex section protection.

- **Alarm function**

Provides integrated alarm and report functions of SDH, PDH,

Ethernet, etc.

Provides 6 ports of circumstance monitor interfaces（TTL level） and 6 ports of control interfaces（TTL level）.

Provides temperature, power alarm and performance monitor functions.

Provides fan alarm functions and fan card can be removed out under electricity-on conditions.

- **Network management system with perfect functions**

OTNM2000 optical transmission network management system can perform centralized OMA （ operation, maintenance and administration） for this equipment to carry out circuit configuration, fault management and performance supervision for well running of network. Remote online downloading and upgrading of equipment system software is also supported.

- **Power supply**

Users can select one of the following three power supply modules: -48V DC , +24V DC and 220V AC. (Power module can be removed and replaced and users do not need to open equipment cover.) It supports 1+1 DC protection, DC working voltage (over voltage, under voltage) protection and connecting backward protection. Under typical configuration, its power consumption is < 50W.

Note :OTNM2000 system is a network management system for management of transmission , access equipments developed and produced by FiberHome Company.Its communication protocol obeys ITU-T recommendations and ISO specifications,and meets with technical specifications of correponding national , industry and enterprise standards.

OTNM2000 system is a network management system with strong functions.It has 4 management functions : performance management, fault management, configuration management and security management. It can perform alive supervision and control for system.

OTNM2000 system has graphic user interface, with following characteristics: convenience and flexible maintenance,timely and accurate fault location, complete performance statistics andanalysis.

2 Outline Description and Equipment Principles

This chapter mainly gives description on outline and principles of IBAS110A equipment to help users understand mechanism , cable connection meaning, LED meaning, terminal definition and working principles. It includes the following contents:

- Mechanism of whole equipment
- Front panel
- Rear panel
- Side panel
- Equipment working principles

2.1 Mechanism of Whole Equipment

Its outline dimension is 440mm（width）×357.5mm（depth）×88mm（height）, as well as 480mm（width）×361.5mm（depth）×88mm（height） with bent angles installed. Its diagram is as follows:

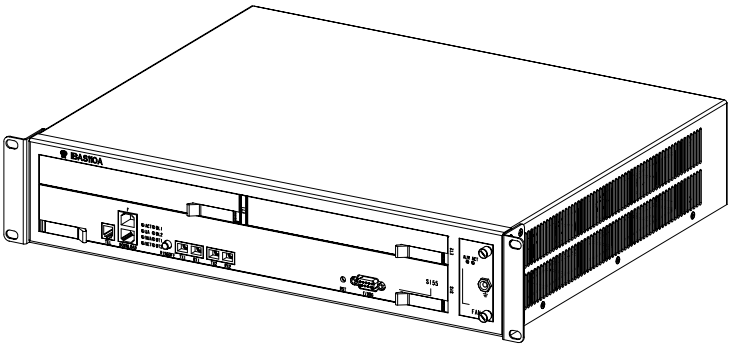


Figure 2-1 IBAS110A equipment outline

This equipment can be installed inside 19-inch racks, also can be hung on wall or put on table. Depth of 19-inch rack is 600mm, including three types: high rack, medium-heighted rack, low rack. The top of rack is alarm, order wire call and main power distribution part. For multiple equipments installed inside 19-inch racks, the whole structure is indicated as follows:

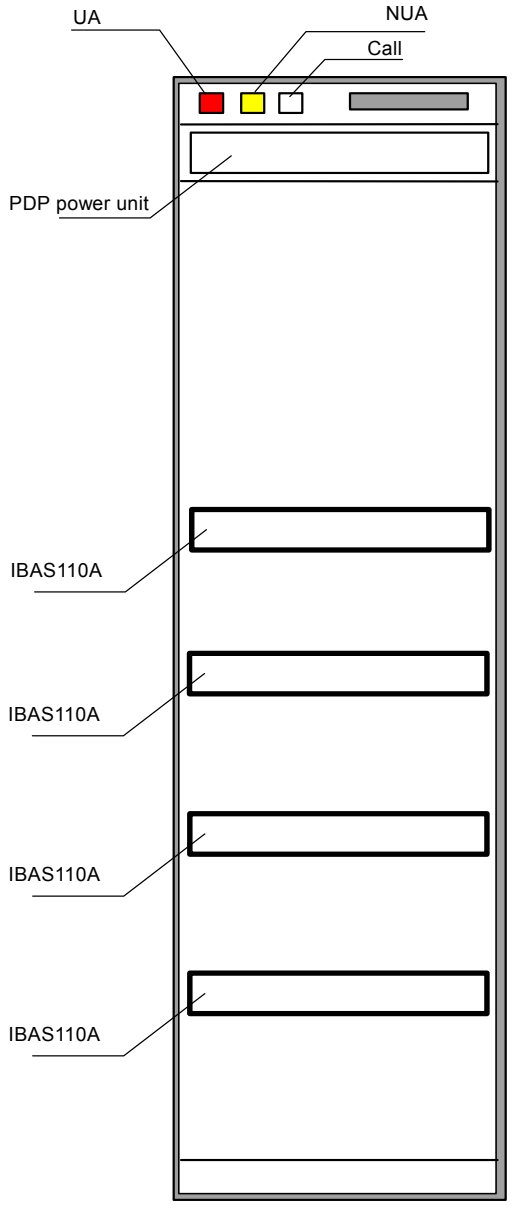


Figure 2-2 IBAS110A equipment whole structure

2.2 Front Panel

Front panel of IBAS110A equipment is shown as the following figure:

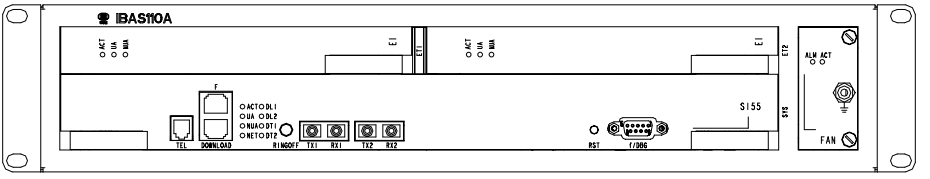


Figure 2-3 Front panel of IBAS110A equipment

As the figure above shows, IBAS110A equipment is divided into two layers: upper layer is slot for two extension tributary cards, being ET1 and ET2 from left to right; low layer is system card slot for insertion of system cards such as S155, S155E8, S622E8, etc. The most commonly used S155 system card panel is shown as the above figure (other system cards have similar panels). The right part inside the figure is the fan card which can be disassembled and installed on line for easy replacement and maintenance. There are working LED(ACT) and alarm LED（UA/NUA）on panel. When the card works normally, ACT shines; when the card does not work normally, UA/NUA shines. At the same time, one plug is set on fan card panel for insertion of antistatic wrist strap.

Description of system card panel connector is as the following table:

Table 2-1 Description of system card panel connector

Name	Description
TEL	Order wire interface
F	Equipment network management interface, connected

	with network management working station or server
DOWNLOAD	Equipment system software download interface
TX1,RX1	Optical transmit and receive interfaces of line 1
TX2,RX2	Optical transmit and receive interfaces of line 2
RINGOFF	Alarm ring off switch
RST	Forced reset switch of equipment. When equipment works normally, this switch should not be touched randomly to avoid service damnification
f/DBG	f interface/equipment debug interface
	Connected with antistatic wrist strap

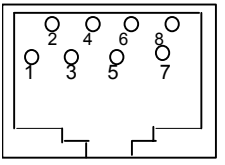
LED is described as follows:

Table 2-2 LED description

Name	Description	Name	Description
ACT	Working LED, shining under normal working conditions	DL1	Line 1 communication LED, shining with green light when DCC of line 1 working normally
UA	Urgent alarm LED, not shining under normal working conditions while shining with red light for urgent alarm	DL2	Line 2 communication LED, shining with green light when DCC of line 2 working normally
NUA	Non-urgent alarm LED, not shining under normal working conditions while shining with yellow light for non-urgent alarm	DT1	Extension tributary 1 communication LED, shining with green light when DCC of Extension tributary 1 working normally
NET	Network access LED, shining	DT2	Extension tributary 2

	when network management working station communicating with equipment		communication LED, shining with green light when DCC of Extension tributary 2 working normally

F interface is RJ45,with its front view shown as Figure 2-4：



Pin1：ATX+

Pin 2：ATX-

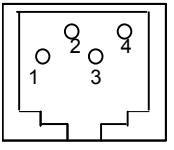
Pin 3：ARX+

Pin 6：ARX-

Figure 2-4 RJ45 front view（F interface）

Download interface has the same definition as that of F interface.

The interface of order wire is TEL RJ11, whose front view is shown as Figure 2-5:



Pin1：

Pin2：PHONE1

Pin3：PHONE2

Pin4 ：E

Figure 2-5 Definition of order wire interface pin

2.3 Rear Panel

Rear panel of IBAS110A is indicated as the following figure:

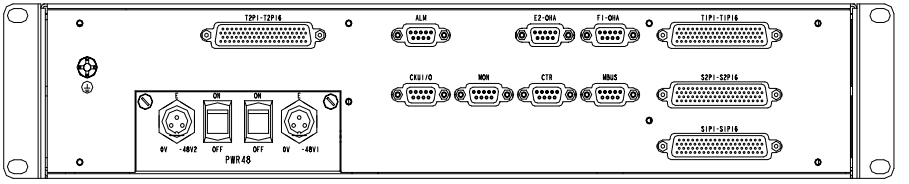


Figure 2-6 Rear panel of IBAS110A equipment

As shown in the above figure, IBAS110A rear panel is composed of two parts: power module part and rear panel connector part.

It can be configured with one of the following three power module: -48V（PWR48）, +24V（PWR24） or 220V AC（AC220）. DC power supports 1+1 2- input.

-48V power module is shown as Figure 2-7：

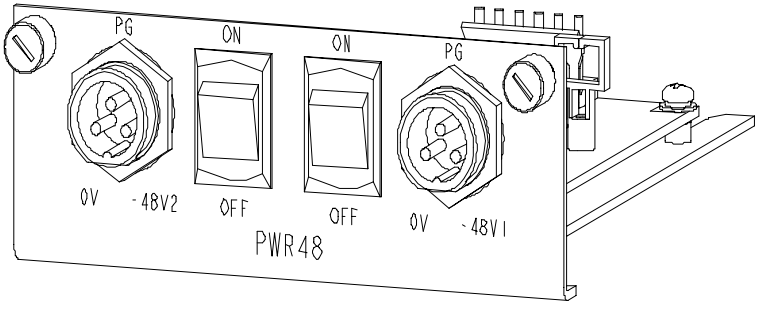


Figure 2-7 -48V power module

+24V power module is shown as Figure 2-8：

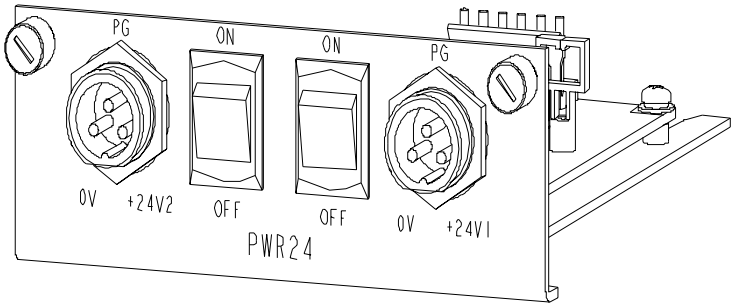


Figure 2-8 +24V power module

220V power module is shown as Figure 2-9：

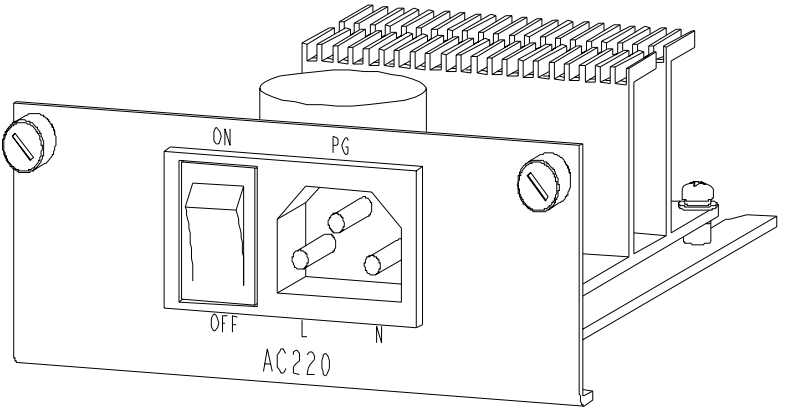


Figure 2-9 220V power module

Rear panel connector is described as the following table:

Table 2-3 Rear panel connector

Name	Description
S1P1-S1P16	1st-16th E1 interfaces corresponding to system tributary 1
S2P1-S2P16	1st-16th E1 interfaces corresponding to system tributary 2
T1P1-T1P16	1st-16th E1 interfaces corresponding to extension tributary 1

T2P1-T2P16	1st-16th E1 interfaces corresponding to extension tributary
ALM	Alarm interface for output to PDP on rack top
CKUI/O	External clock input/output interface
MON	External circumstance supervision interface
CTR	External circumstance control interface
E2-OHA	E2 data interface
F1-OHA	F1 data interface
MBUS	RS485 management interface
	Equipment protection ground

Network management interfaces of this equipment include F, f/DBG, MBUS interfaces. Among them, F and f/DBG interfaces are at front panel, and MBUS interface at rear panel. External clock interface CKUI/O is at rear panel. Overhead management and other interfaces include MON interface, CTR interface, ALM interface, E2-OHA interface, F1-OHA interface, DOWNLOAD interface, TEL interface, with DOWNLOAD interface and TEL interface at front panel and others all at rear panel. All user interfaces adopt D-type 9-pin connector. Their pin definition is indicated as Figure 2-10, Table 2-4.

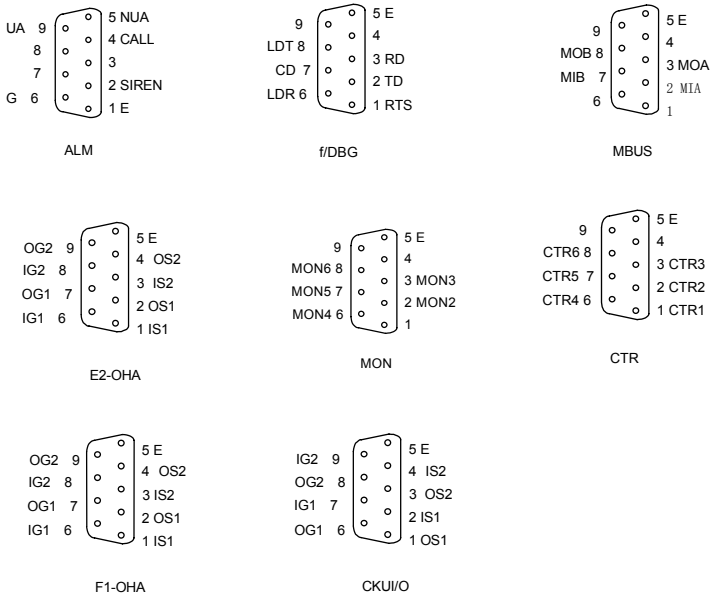


Figure 2-10 Socket pin definition of various interfaces

Table 2-4 Terminal definition（refer to equipment for output/input）

Network management interface	Terminal	Definition
F interface	ATX+,ATX-	F interface data output
	ARX+,ARX-	F interface data input
f/DBG interface	RD,TD	f interface data output
	CD,RTS	F interface handshaking signal, on opinion
	LDR,LDT	DEBUG interface input/output
	E	Signal ground
DOWNLOAD interface	ATX+,ATX-	Data output
	ARX+,ARX-	Data input
TEL interface	PHONE1,PHONE2	Bi-line order wire call signal
MBUS interface	MIA,MIB	MBUS data input
	MOA,MOB	MBUS data output
	E	Signal ground
MON interface	MON1-MON6	Circumstance supervision data input（TTL）
CTR interface	CTR1-CTR6	Circumstance supervision data output（TTL）

Network management interface	Terminal	Definition
CKUI/O interface	OS1-OS2	2 ports of external clock output signal wire
	OG1-OG2	2 ports of external clock output ground wire
	IS1-IS2	2 ports of external clock input signal wire
	IG1-IG2	2 ports of external clock input signal wire
	E	Signal ground
ALM interface	SIREN	Alarm ring output
	UA,NUA	Urgent alarm, non-urgent alarm output
	CALL	Call alarm LED output
	G	G ground
	E	Signal ground
E2_OHA interface F1_OHA interface	IS1-IS2	2 ports of input signal wire
	IG1-IG2	2 ports of input signal ground wire
	OS1-OS2	2 ports of output signal wire
	OG1-OG2	2 ports of output signal ground wire

2.4 Side Panel

There are fan wind in/out jacks on left/right side panels of IBAS110A equipment.

2.5 Equipment Working Principles

The whole diagram of this equipment is shown as Figure 2-11. It is composed of main traffic path, management and system timing parts.

Main traffic path performs add/drop and transmission functions of service signals.

Management part provides management communication interface, order wire, overhead processing functions.

Timing parts provides various timing signals for working of equipment. When external timing or line has fault, it provides maintenance of timing, to ensure equipment normal working. The clock reference of timing can be external clock, line clock and internal clock. Users can select one of them on demand. At the same time, system timing has lock-up, hold over and free running modes to meet different application demands.

The equipment can support 2 extension cards, respectively called extension card 1 and 2.

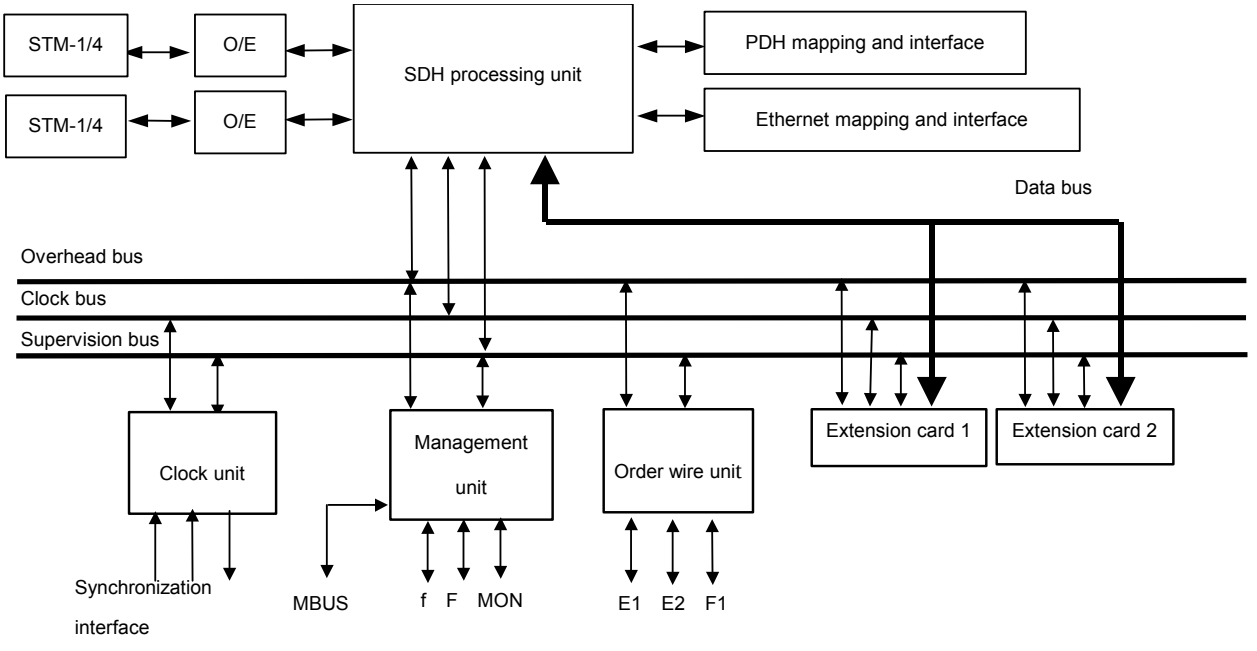


Figure 2-11 Whole structure of IBAS110A equipment

Signal processing procedure of equipment: in optical receiving direction, first performs O/E conversion for STM-1/4 optical signals. Then recovers clock and data through demultiplex, clock processing units. Then frame synchronization, overhead processing, demap are carried out to obtain 2Mbit/s (Ethernet) signal output. For optical transmitting direction, it is the opposite procedure of that of optical receiving direction.

In addition, this equipment has synchronization timing function. After processing of interface, the 2Mbit/s or 2MHz external synchronization clock signal can act as equipment external timing source.

The equipment processes overhead bytes (including E1,E2, F1,S1, DCC, etc.) at receiving side. The expanding card is for equipment capacity extension, being able to be configured with service cards such as 155Mbit/s optical interface card, 2Mbit/s interface card, PDH 8Mbit/s optical tributary card, PDH data interface card and Ethernet interface card, etc. As well this type of extension card can be compatible with corresponding cards of IBAS180（GF2488-01D） produced by FiberHome.

Type and specification of cards are listed as Table 2-5:

Table 2-5 Card types

Card name	Abbreviation	Function	Type	Symbol in network management system	Code
155Mbit/s system card	S155	STM-1 system card,including 2 STM-1optical interfaces and 32 E1 interfaces	System card	S155	2.061.071
155Mbit/s system card （with Ethernet interface）	S155E8	STM-1 system card,including 2 STM-1optical interfaces, 32 E1 interfaces , 3 34/45Mbit/s interfaces and 8 10/100Mbit/s electrical interfaces	System card	S155E8	2.061.073
622Mbit/s system card （with Ethernet interface）	S622E8	STM-4 system card,including 2 STM-4 optical interfaces , 32 E1 interfaces , 3 34/45Mbit/s interfaces and 8 10/100Mbit/s electrical interfaces	System card	S622E8	2.061.072
155Mbit/s system card （with Ethernet optical interface）	S155E8	STM-1 system card,including 2 STM-1optical interfaces , 32 E1 interfaces , 3 34/45Mbit/s interfaces and 8 10/100Mbit/s optical interfaces	System card	S155E8	2.061.075
622Mbit/s	S622E8	STM-4 system	System card	S622E8	2.061.074

Card name	Abbreviation	Function	Type	Symbol in network management system	Code
system card （with Ethernet optical interface）		card,including 2 STM-4 optical interfaces, 32 E1 interfaces, 3 34/45Mbit/s interfaces and 8 10/100Mbit/s optical interfaces			
PDH optical tributary card	O8	PDH optical tributary card, including 8 channels of E1 interfaces	Extension card	O8_2	2.166.198
PDH optical tributary card	O8E	PDH optical tributary card, including 2 channels of PDH optical tributary, 8 channels of E1 interface, 2 channels of Ethernet interface	Extension card	O8E_2	2.166.209
PDH optical tributary card	O8V	PDH optical tributary card, including 2 channels of PDH optical tributary, 8 channels of E1 interface, 2 channels of V.35 interface	Extension card	O8V_2	2.166.210
PDH data interface card	D8E	Including 8 channels of E1 interface, 2 channels of Ether net interface	Extension card	D8E_2	2.166.672
PDH data interface	D8V	Including 8 channels of E1	Extension card	D8V_2	2.166.673

Card name	Abbreviation	Function	Type	Symbol in network management system	Code
card		interface, 2 channels of V.35 interface			
2Mbit/s interface card（75Ω）	E1	E1interface card, including 16 channels of 2Mbit/s interface	Extension card	E1_32B	2.166.152
2Mbit/s interface card（120Ω）	E1	E1 interface card, including 16 channels of 2Mbit/s interface	Extension card	E1_32B	2.166.160
155Mbit/s optical interface card	O155	Providing one channel of STM-1 optical interface	Extension card	O155_2B	2.170.525
Low level Ethernet electrical interface card	ESD1	Providing 4 channels of Ethernet electrical interface based on low level channels. Supporting Ethernet switch functions	Extension card	ESD1	2.115.224
Low level Ethernet optical interface card	ESD1	Providing 4 channels of Ethernet optical interfaces. Supporting Ethernet switch functions	Extension card	ESD1	2.115.225
4-channel fast Ethernet switch card	ESW4	Including 4 channels of Ethernet electrical interface, and supporting switch functions	Extension card	ESW_4	2.170.528
4-channel	ETH4	Including 4	Extension	ETH_4	2.170.590

Card name	Abbreviation	Function	Type	Symbol in network management system	Code
fast Ethernet transparent transfer card		channels of Ethernet electrical interface, and supporting switch functions	card		
-48Vpower board	PWR48	Providing 2 channels of -48V power input	Power card		2.933.266
+24Vpower board	PWR24	Providing 2 channels of +24V power input	Power card		2.933.267
AC power board	AC220	Providing 220V AC power input	Power card		2.933.268
Fan board	FAN	Providing wind-freezing heat dispersion function	Fan card		2.119.129

2.5.1 Function Description of System Card

This manual mainly introduces functions of S155 system card. As for S155E8, S622E8 system cards and other cards to be developed, they will be introduced in manuals of new editions. S155 system card is composed of SDH processing, PDH interface, clock unit, order wire unit, and management unit.

SDH processing

- SDH processing unit completes SOH and POH overheads processing of 2 channels of STM-1 signals, and supports all defined SOH overhead access and processing. For VC-4/VC-3 service,it supports overhead processing of J1, B3, C2, G1 bytes;

for VC-12 service, supports overhead processing of J2, V5 bytes.

- Performs clock adaptation functions between system clock and line clock through pointer adjustment.
- Completes cross connection management between system card and extension card. For STM-1rate system, the equipment cross can be base on VC4/VC3/VC12, with cross capability being 6×6 VC4.
- The system supports line protection , 2-fiber multiplex section ring protection and VC4/VC3/VC12 path protection between line 1 and line 2.

PDH interface

- Completes map and demap of 32 channels of E1 circuits and line interface functions
- E1 interface can be expanded to 64 channels with extension card.
- The equipment can support either 75Ω or 120Ω 2Mbit/s interfaces, which can be selected with jumpers inside system card.
- For S1P1 and S2P1 E1 interfaces,it supports re-timing functions, i.e., making the 2Mbit/s interface output clock having synchronization with that of equipment system clock. In level to avoid slip code of 2Mbit/s interface, equipment must work under full-network synchronization condition. This can be configured through network management system. Setting methods of 75Ω or 120Ω E1 interface are as Figure 2-6：

Table 2-6 E1 Interface configuration methods

155Mbit/s system card (S155)		
E1 interface code	75Ω interface	120Ω interface
S1P1	Short circuit plug on JP1, JP2	Short circuit plug not on JP1, JP2
S1P2	Short circuit plug on JP3, JP4	Short circuit plug not on JP3, JP4
S1P3	Short circuit plug on JP5, JP6	Short circuit plug not on JP5, JP6
S1P4	Short circuit plug on JP7, JP8	Short circuit plug not on JP7, JP8
S1P5	Short circuit plug on JP11, JP12	Short circuit plug not on JP11, JP12
S1P6	Short circuit plug on JP13, JP14	Short circuit plug not on JP13, JP14
S1P7	Short circuit plug on JP15, JP16	Short circuit plug not on JP15, JP16
S1P8	Short circuit plug on JP17, JP18	Short circuit plug not on JP17, JP18
S1P9	Short circuit plug on JP25, JP26	Short circuit plug not on JP25, JP26
S1P10	Short circuit plug on JP27, JP28	Short circuit plug not on JP27, JP28
S1P11	Short circuit plug on JP29, JP30	Short circuit plug not on JP29, JP30
S1P12	Short circuit plug on JP31, JP32	Short circuit plug not on JP31, JP32
S1P13	Short circuit plug on	Short circuit plug not on

	JP35, JP36	JP35, JP36
S1P14	Short circuit plug on JP37, JP38	Short circuit plug not on JP37, JP38
S1P15	Short circuit plug on JP39, JP40	Short circuit plug not on JP39, JP40
S1P16	Short circuit plug on JP41, JP42	Short circuit plug not on JP41, JP42
S2P1	Short circuit plug on JP45, JP46	Short circuit plug not on JP45, JP46
S2P2	Short circuit plug on JP47, JP48	Short circuit plug not on JP47, JP48
S2P3	Short circuit plug on JP49, JP50	Short circuit plug not on JP49, JP50
S2P4	Short circuit plug on JP51, JP52	Short circuit plug not on JP51, JP52
S2P5	Short circuit plug on JP54, JP55	Short circuit plug not on JP54, JP55
S2P6	Short circuit plug on JP56, JP57	Short circuit plug not on JP56, JP57
S2P7	Short circuit plug on JP58, JP59	Short circuit plug not on JP58, JP59
S2P8	Short circuit plug on JP60, JP61	Short circuit plug not on JP60, JP61
S2P9	Short circuit plug on JP63, JP64	Short circuit plug not on JP63, JP64
S2P10	Short circuit plug on JP65, JP66	Short circuit plug not on JP65, JP66
S2P11	Short circuit plug on JP67, JP68	Short circuit plug not on JP67, JP68

S2P12	Short circuit plug on JP69, JP70	Short circuit plug not on JP69, JP70
S2P13	Short circuit plug on JP71, JP72	Short circuit plug not on JP71, JP72
S2P14	Short circuit plug on JP73, JP74	Short circuit plug not on JP73, JP74
S2P15	Short circuit plug on JP75, JP76	Short circuit plug not on JP75, JP76
S2P16	Short circuit plug on JP77, JP78	Short circuit plug not on JP77, JP78

Clock unit

It carries out tracking functions to reference clock source. It provides united system clock for system and completes SSM termination and processing. The working mode includes lock-up mode, hold over mode, and free running mode. Clock reference source type is shown in Table 2-7. The input/output interface can be 2048 kHz or 2048kb/s. The interface has two configuration modes: 120Ω and 75Ω, which can be selected with jumpers inside system card. The configuration is as Table 2-8.

Table 2-7 Clock reference source definition

Reference source type	SDH line	SDH optical tributary	E1 tributary	External clock
Reference source	Line 1	Tributary 1	Tributary 3（S1P1）	External clock 1
Reference source	Line 2	Tributary 2	Tributary 4（S2P1）	External clock 2

Table 2-8 Clock unit configuration method

155Mbit/s system card(S155)				
External clock code	75Ω interface	120Ω interface	Input ground	Output ground
External clock code 1	Short circuit plug on JP34	Short circuit plug not on JP34	Short circuit plug on JP20	Short circuit plug on JP19
External clock code 2	Short circuit plug on JP33	Short circuit plug not on JP33	Short circuit plug on JP21	Short circuit plug on JP22

Management unit

- It manages and controls the equipment, as well provides management interface. The IP address of equipment can be configured through f interface with LCT（EOT）, also can be configured with dialing switches inside card. The S155 system card has 3 8-digit switches K3, K4, K5. If switch setting is adopted, the high 16 digits of 32-digit IP address are 10. 18. X. X fixedly and low 16 digits are determined by K4 and K5 with their high 2 digits being “0” fixedly. At the same time, K3 can be used for setting of default working mode. When equipment is started up with no network management system, users can use default setting. Configuration methods of K3, K4, K5 are as Table 2-9：

Table 2-9 Configuration methods of K3, K4, K5

155Mbit/s system card (S155)			
K5	Bit8-Bit1	Address setting	Under IP protocol, corresponding to low byte of physics address and 4th byte of IP address
			Under TP4 protocol,Bit8 corresponding to line 1 N/U; Bit7 corresponding to line 2 N/U; Bit6-Bit1 corresponding to low byte of physics address(high two digits being “0”)
K4	Bit8	Protocol setting	Under IP protocol, Ethernet PRI selection（OSPF protocol usage）
			Under IP protocol, Bit8 corresponding to extension tributary 1 N/U configuration
	Bit7	Address setting	“0”indicating setting through LCT（EOT）,”1” indicating network element IP address setting through dialing switch inside card
			Under TP4 protocol, Bit7 corresponding to extension tributary 2 N/U configuration
	Bit6-Bit1	Address setting	Under IP protocol, Bit6-Bit1 corresponding to high bytes of physics address and low 6 digits of IP address 3rd byte（High two digits being “0”）
			Under TP4 protocol,Bit6-Bit1 corresponding to high bytes of physics address (high 2 digits being “0”)2
K3	Bit8	Equipment configuration	“0”indicating setting through network management system, “1” indicating setting through dialing switch
	Bit7	Clock mode	“0”indicating auto tracking reference,”1”indicating free running mode
	Bit6	Clock source	“0”indicating clock tracking reference of line 1, “1” indicating clock tracking reference of line 2

	Bit5		For reservation
	Bit4-Bit1	Cross mode	“0000”indicating time slots 1-32 from S1P1-S1P16 and S2P1-S2P16 to line 1and line 2, time slots 33-63 being direct through and channel protection start-up
			“0001”indicating time slots 1-63 of line 1 and 2 being direct through
			“0010” indicating time slots 1-32 from S1P1-S1P16 and S2P1-S2P16 to line 1 and line 2, other time slots being direct through and path protection start-up
			“0011” indicating time slots 17-32 from S1P1-S1P16 and S2P1-S2P16 to line 1 and line 2, other time slots being direct through and path protection start-up
			“0100” indicating time slots 33-48 from S1P1-S1P16 and S2P1-S2P16 to line 1 and line 2, other time slots being direct through and path protection start-up
			“0101” indicating time slots 49-63 from S1P1-S1P15 to line 1 and line 2,other time slots being direct through and path protection start-up
			Other codes for reservation

Note：dialing switch ON indicates”0”, OFF indicates”1”.

Sub-network mask code of network element：255.255.255.0.

Domain ID of network element autonomy system: if network element IP address is W.X.Y.Z, domain ID of network element autonomy system is W.X.0.0.

Domain mask code of network element autonomy system is 255.255.0.0.

- It supports RS485 interface for management of other FiberHome access equipment or PDH equipment. The RS485 interface of equipment management unit has the following two connection methods: one is connected with equipment rear MBUS interface through short circuit plug to manage other equipments, the other is as follows: connecting with rear board DEBUG bus through short circuit plug, then connecting with PDH management bus inside PDH optical tributary card to manage remote equipment. The selection method is as the following table, with default as connection with MBUS interface:

RS485 interface of management unit connected with MBUS interface. Panel DEBUG interface usable	RS485 interface of management unit connected with panel board DEBUG bus. Panel DEBUG interface unusable
Inserting short circuit plugs at pin1 and pin2 of JP79,and pin1, pin2,pin3,pin4 of JP43	Inserting short circuit plugs at pin2 and pin3 of JP79 and JP43

- Provides 6 circumstance supervision parameters and 6 circumstance control parameters and can define alarm level （TTL）.The first 3 default supervision parameters are AC power alarm（ACALM）,battery alarm (BATTALM）and door alarm （DOORALM）.
- DCC channel can select DCCR or DCCM（through network management system）. In addition, when network management system needs manage equipment spanning in other transmission networks, DCC channel can also be transported

through high level channel overhead F2 by short circuit plug. As shown in the following table, the default selection of DCC channel is DCCR or DCCM：

DCC channel selection: DCCR or DCCM	DCC channel selecting F2 channel
Inserting short circuit plug at pin1 and pin2 of JP80-JP87	Inserting short circuit plug at pin2 and pin3 of JP80-JP87

Order wire unit

- It provides one channel of order wire phone with 4-digit code. This can be configured directly by network management system. Order wire codes should not repeat with each other. For EOW-2 protocol,there is no special requirement on code setting. But for EOW-1 protocol, the first two digits of 4-digit phone code indicates code of main chain area, the third digit indicates tributary direction, and the fourth digit indicates station code at tributary. The main chain area code is requested to be arranged in sequence. This channel of phone only performs address selection call.

  When using EOW-1 protocol to set phone code, users should keep to the following regulations:

  A. At first, determines network main chain and branches. For main chain, the more stations are included, the better it is. While for branches, they should be relatively shorter. This is “long main chain, short branch”.

  B. Various stations at main chain include two types: stations with no branches and with branches .The stations with no branches are configured with code “10xx”,within range of

1000～1099. As for stations with branches at main chain, when they have one grade of branch, the code range is （11～xx～29）00. When they have two grades of branches, users should set special codes such as 3xxx, 4xxx, 5xxx, 6xxx etc. 3,4,5,6 codes of 1st digit indicate that main chain has two grades of branches, the 2nd digit indicates grade 1 branch code, the 3rd digit indicates grade 2 branch code, and the 4th digit indicates tributary station code.

C. The PRI sequence of code distribution in main chain direction and branch direction is: W1, E1, T1, T2, T3.

- Dialing call supports modes of point call and multi-point call (confernence call); supports forced disconnection and multi-point call authorization.
- Performs termination functions of E1, E2, F1 overhead bytes. It can use E2 channel to provide 2 data interfaces (can adopt RS232 interface,with rate below 9.6Kbit/s) for external equipments such as circumstance system etc. Supports 4 directions under point-to-point mode or bus mode. It can utilize F1channel to provide other 2 data interfaces for external equipments such as circumstance supervision system etc. and also supports 4 directions under point-to-point mode or bus mode.

2.5.2 Function Description of Extension Card

2Mbit/s interface card

This interface card can carry out card configuration management, fault management, performance management functions. It can

process 16 2Mbit/s tributary bi-direction signals. In drop direction, VC4 signal is demapped and demultiplexed into 2048Kbit/s signal through rear board bus. In add direction, 2048Kbit/s signal is mapped into VC4 container through TU12 and sent into rear board bus. This card has two types: 75Ω and 120Ω. Its working principle and signal flow direction are as the following diagram:

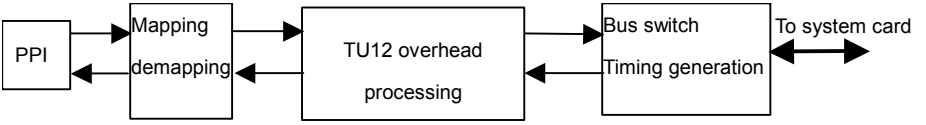


Figure 2-12 Working principle of 2Mbit/s interface card

2Mbit/s interface card panel：

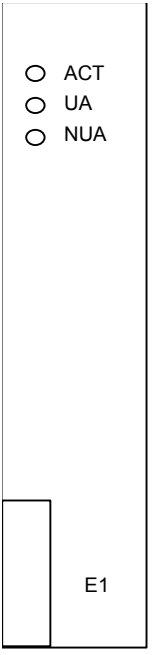


Figure 2-13 2Mbit/s interface card

It has 3 indication LEDs：

ACT：Working LED, green;twinkles when card is under working condition.

UA：Urgent alarm LED, red;its shining indicates urgent alarm.

NUA：Non-urgent alarm LED, yellow;its shining indicates non-urgent alarm.

4-port fast Ethernet switch transparent transmission card （ESD1）

It has 4 external 10/100Mbit/s Ethernet interfaces meeting 802.3 specification. It supports port configuration of 8 virtual container groups (VCG) and can be connected to 8 service directions. One VCG port supports virtual concatenation of 1-63 VC12s, capsulation protocols such as GFP-F/LAPS/HDLC and LCAS (link capacity adjustment scheme) function (the newer version will support the function of MPLS i.e. multi-protocol label switching). 2-layer Ethernet switch function can be performed between the 4 external Ethernet interfaces and 8 internal VCG interfaces.

This card can be configured with EPL, EVPL, EPLAN, EVPLAN services. It can act as 4-port fast Ethernet switch transparent transmission card (optical/electrical interface). Its working principle is as follows:

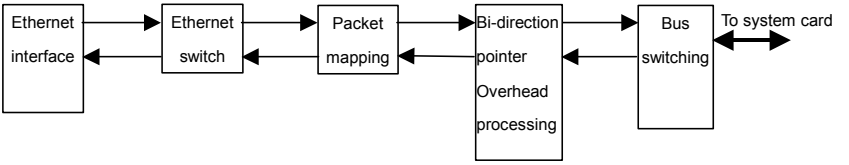


Figure 2-14 Working principle of low level Ethernet interface card

Its panel is as follows:

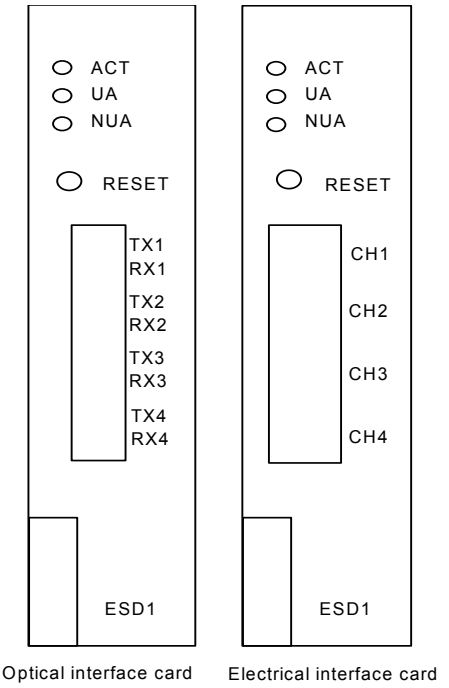


Figure 2-15 Panel of low level Ethernet interface card

Its panel has 3 indication LEDs:

ACT：Working LED, green. When it is under working condition, it shines.

UA：Urgent alarm LED, red. Its shining indicates urgent alarm.

NUA：Non-urgent LED, yellow. Its shining indicates non-urgent alarm.

RESET key switch：Reset key. if this key is pressed, the Ethernet card shall reset.

In addition, this card has other 4 pairs of Ethernet interfaces: TX1,RX1~TX4,RX4 being 4 pairs of Ethernet optical interfaces;CH1~CH4 being 4 pairs of Ethernet electrical interfaces.

Each of them can be used for 10Mbit/s/100Mbit/s full-duplex Ethernet services.

Ethernet switch card and Ethernet transparent transmission card

Ethernet cards can be sorted as two types: Ethernet switch card and Ethernet transparent transmission card. It has 4 external 10/100Mbit/s Ethernet electrical interfaces meeting 802.3 specification. It supports internal port configuration of 8 virtual container groups (VCG) and can be connected to 4 directions of services. One VCG port supports virtual concatenation of 1-63 VC12s, PPP encapsulation protocols. 2-layer Ethernet switch function can be performed between the 4 external Ethernet interfaces and 4 internal VCG interfaces. (Note: this is for Ethernet switch card but not for Ethernet transparent transmission card).

Ethernet transparent transmission card can be configured with EPL service. Ethernet switch card can be configured with EPL, EVPL, EPLAN, EVPLAN services. It can be configured as 4-port Ethernet switch card and 4-port Ethernet transparent transmission card. Its working principle is as the following figure:

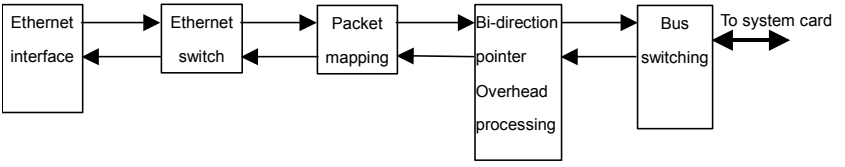


Figure 2-16 Working principle of Ethernet card

Ethernet card panel:

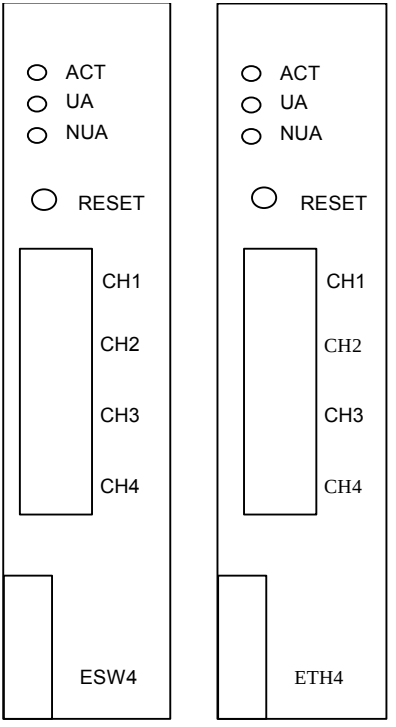


Figure 2-17 Ethernet card panel

Its panel has 3 indication LEDs:

ACT：Working LED, green. When it is under working condition, it shines.

UA：Urgent alarm LED, red. Its shining indicates urgent alarm.

NUA：Non-urgent LED, yellow. Its shining indicates non-urgent alarm.

RESET key switch：Reset key. if this key is pressed, the Ethernet card shall be reset.

In addition, this card also has 4 pairs of Ethernet electrical interfaces

CH1~CH4. Each one of them can be used for 10Mbit/s/100Mbit/s full-duplex Ethernet services.

STM-1 optical interface card

STM-1 optical interface card has one STM-1 optical interface, supporting S1.1, L1.1, and L1.2 optical interfaces. It uses SC connectors. This card can be used to establish STM-1 optical branch service. It mainly completes functions such as O/E conversion, clock extraction and integration, multiplex/demultiplex and SOH, POH overhead processing. Its working principle and signal flow direction are shown as the following figure:

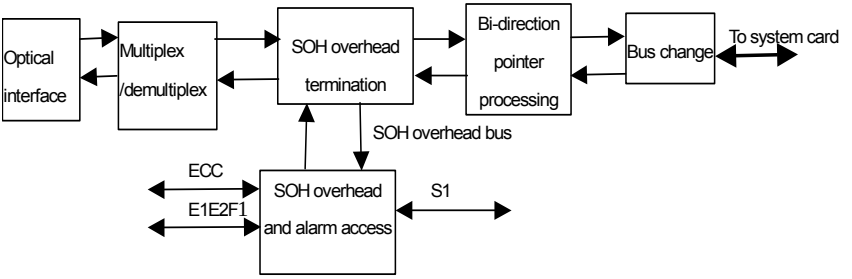


Figure 2-18 STM-1 optical interface card principle

STM-1 optical card panel：

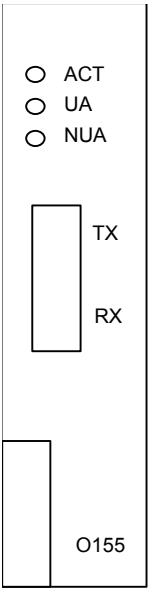


Figure 2-19 STM-1 optical interface card panel

Its panel has 3 indication LEDs:

ACT：Working LED, green. When it is under working condition, it shines.

UA：Urgent alarm LED, red. Its shining indicates urgent alarm.

NUA：Non-urgent LED, yellow. Its shining indicates non-urgent alarm.

It has one optical interface on panel, with TX FOR optical output interface and RX for optical input interface.

PDH optical branch card

It is comparable with PDH data interface card.

It has 2 25Mbit/s PDH optical interfaces（can perform add/drop 8 2Mbit/s signals）, 2 10/100Mbit/s Ethernet interfaces or 2 V.35

interfaces. The optical interface uses SC connector,and 2Mbit/s and V.35 interfaces use 78-pin D-type connector which includes 8 2Mbit/s interfaces and 2 V.35 interfaces. V.35 interface is changed to standard M34 interface through external cables. For 2Mbit/s interface, users can select 75Ω or 120Ω through setting of jumpers. Its configuration method is as Table 2-10：

Table 2-10 PDH 2Mbit/s interface configuration

2Mbit/s interface	Channel 1	Channel 2	Channel 3	Channel 4	Channel 5	Channel 6	Channel 7	Channel 8
Corresponding jumper	JP11	JP9	JP7	JP12	JP13	JP10	JP8	JP14
75Ω	Short connection	Short connection	Short connection	Short connection	Short connection	Short connection	Short connection	Short connection
120Ω	Open	Open	Open	Open	Open	Open	Open	Open

One PDH optical can bear 4 2Mbit/s service signals and one Ethernet service signal (8Mbit/s bandwidth), or 4 2Mbit/s service signals and 1 V.35 service signals. It supports 1+1 line protection of 2 PDH optical interfaces. It can also be used to connect with remote end PDH 8Mbit/s optical terminals produced by FiberHome. Under this condition, it is used to manage PDH network with SDH network management for united management and service extension.

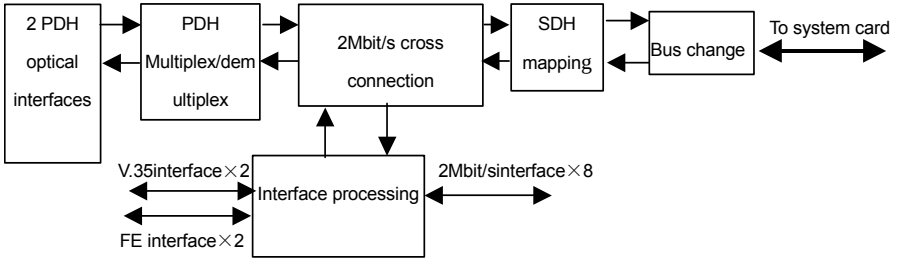
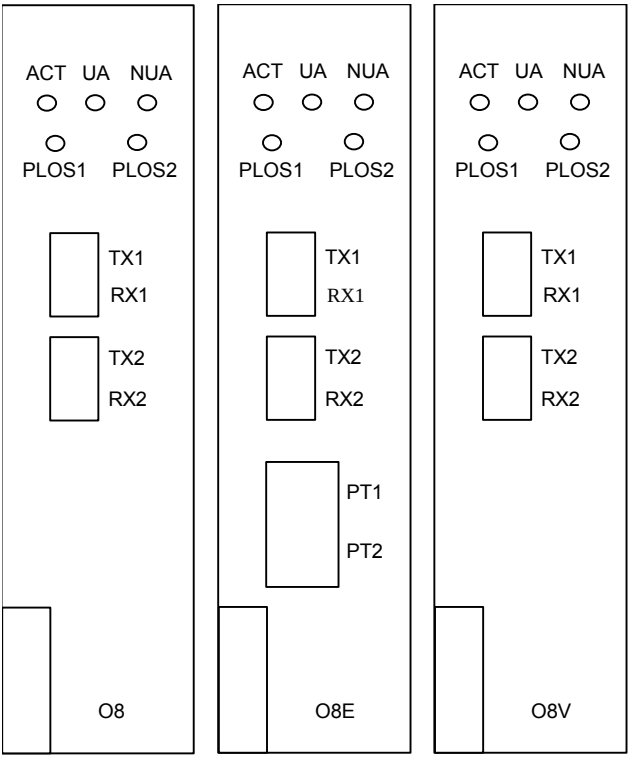


Figure 2-20 PDH optical branch principle

Its panel is as Figure 2-21. It has 5 configuration methods, whose corresponding panel is shown in Figure 2-21:

Serial code	Card name	Function
1	O8	2- channel PDH optical branch card, with 8 2M
2	O8E	2- channel PDH optical branch card, with 8 2M and 2 Ethernet interfaces
3	O8V	2- channel PDH optical branch card, with 8 2M and 2 V.35 interfaces
4	D8E	8 2M and 2 Ethernet interfaces
5	D8V	8 2M and 2 V.35 interfaces


ACT UA NUA
PLOS1 PLOS2
TX1
RX1
TX2
RX2
O8
ACT UA NUA
PLOS1 PLOS2
TX1
RX1
TX2
RX2
PT1
PT2
O8E
ACT UA NUA
PLOS1 PLOS2
TX1
RX1
TX2
RX2
O8V

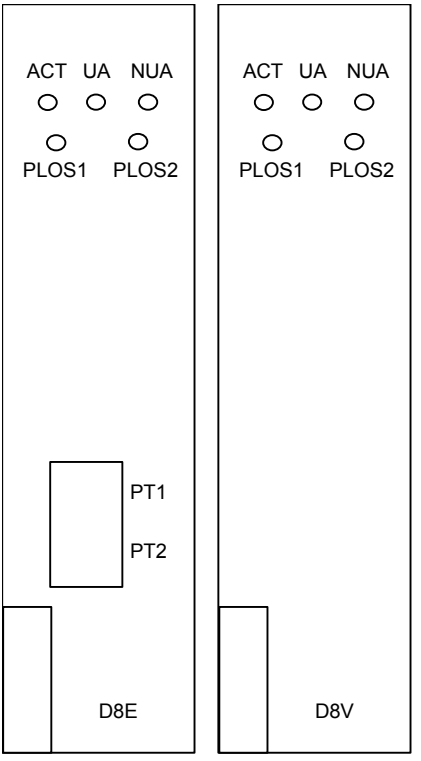


Figure 2-21 PDH optical branch card panel

It has 5 indication LEDs on panel:

ACT：Working LED, green. When it is under working condition, it shines.

UA：Urgent alarm LED, red. Its shining indicates urgent alarm.

NUA：Non-urgent LED, yellow. Its shining indicates non-urgent alarm.

PLOS1：LED of 1st PDH optical interface signal loss.

PLOS2：LED of 2nd PDH optical interface signal loss.

Interfaces on this card panel:TX1,TX2 indicates PDH optical output interface, RX1, RX2 indicates PDH optical input interface;PT1 is 1st Ethernet interface; PT2 is 2nd Ethernet interface. Among them,

Ethernet adopts RJ45connector for add/drop of 2 Ethernet signals. It supports 10/100BASE-T full—duplex service, but its service bandwidth cannot exceed 8Mbit/s.

3 Equipment Installation

This chapter introduces hardware installation of IBAS110A equipment,mainly including the following contents：

- Affairs before installation
- Equipment installation
- Equipment start-up

3.1 Affairs before Installation

Optical transmission equipment needs good circumstance for its well operation. So, users should confirm the following affairs before installation：

- The object installation position must meet external connection requirement of equipment（for example: power wire, network wire, whether needing supervision through serial interface, PC, working station or modem, etc.）.
- The air circulation of equipment room should be ensured for heat dispersion of equipment.
- The installation equipment room should possess waterproof, dampproof, dustproof and thunder proof conditions.

3.2 Equipment Installation

IBAS110A is case 2U structure,which can be laid inside rack or on table or hung on wall.

Pack box open

After equipment arrives installation station, users should first confirm integrality of packet box. Then users can open box and check corresponding articles inside box according to list to ensure the quantity and names of equipment and accessories are consistent with that of packet list.

Cable and wire connection

After completing installation of cable/wire coxial tie-in according to design blueprint, users should lay cables and wires to object equipment according to design for different installation mode(cabinet instalation, table layout or wall-hung). If cabinet installation mode is adopted, user can lay the cables and wires into cabinet along cable slot at sides of cabinet. After the cables and wires reach the object position, user can connect them to correponding sub-rack connectors.

Power wire connection

If equipment adopts DC power supply, WKE3.696.062 power wire is used, with blue wire connected with -48V, black wire connected with 0V（GND） and green /yellow wire connected with protection ground （PE）. Only after external power voltage is affirmed to be correct can external power be connected with. If AC power supply is adopted by equipment, users should use N/10313 power wire. After confirming the voltage to be 220V, the power can be connected with.

The AC power wire is shown as the following figure:

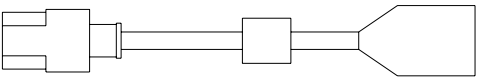


Figure 3-1　220V AC power module

The DC power wire is indicated as the following figure：

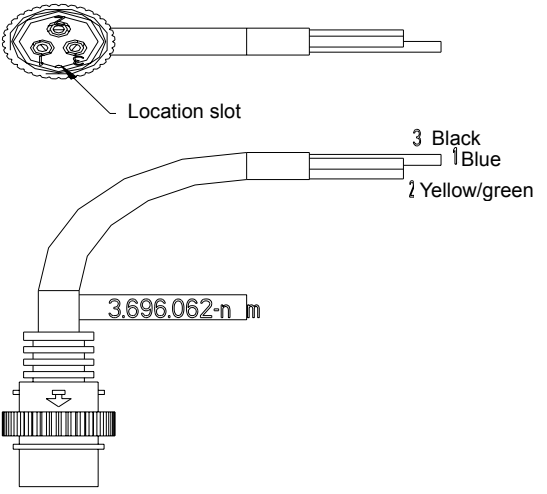


Figure 3-2　-48V/+24V DC power module

Connection of Ethernet wire

Ethernet card or system card can provide Ethernet service, with RJ45 interface. Users can choose standard RJ45 plugs（RJ45-T）for connection;the connection is performed with 5-type UTP cable,including direct through twists（WKE3.695.095）and cross twists

（WKE3.695.096）.

As for 5-type UTP cable connection, when connected equipment is Ethernet HUB or switch, the Ethernet interface should be connected with equipment by direct through UTP cables. When connected equipment is ADSL Modem or NIC installed on PC, the Ethernet port should be connected with equipment by cross UTP cables.

Connection of 2Mbit/s wire

2Mbit/s connection wire has two types(for selection of users): micro coaxial cable（16 core×2）and 120Ω balanced cables（16 pair×2）. Correspondingly, there are two connection modes: 2Mbit/s interface-75 Ω connection wire and 2Mbit/s interface-120 Ω connection wire. If 2Mbit/s interface resistance is 75Ω, micro coaxial cable connection is adopted. If 2Mbit/s interface resistance is 120Ω, 120Ω balanced cable connection is adopted.

2Mbit/s interface connection wire of IBAS110A equipment adopts compression structure. FiberHome provides modules with protection crust plug, which have been performed well on delivery. They are shown as Figure 3-3.

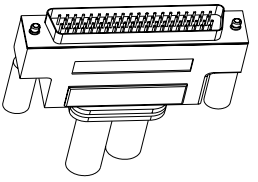
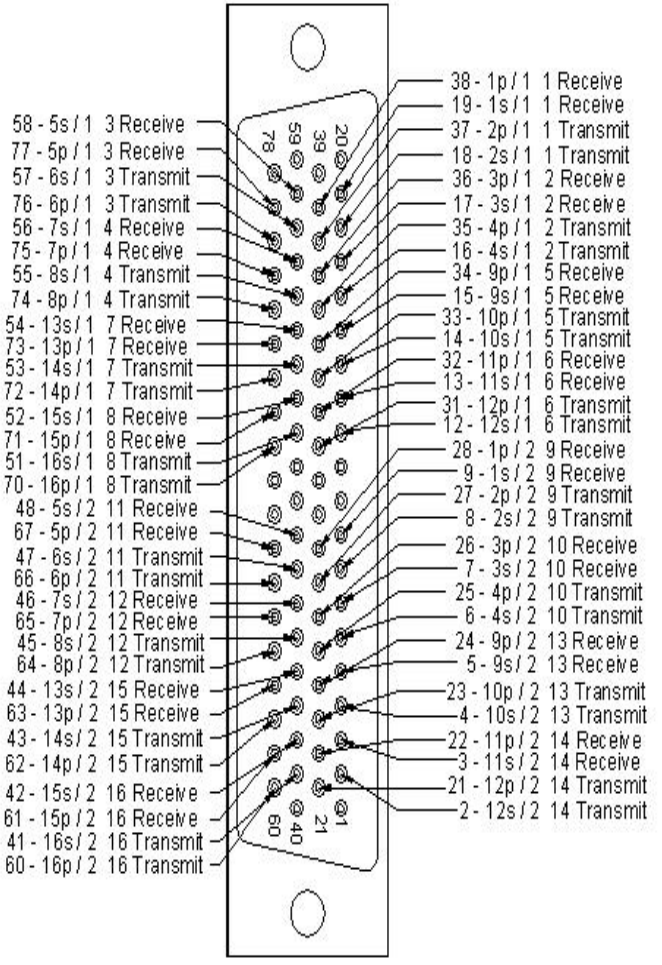


Figure 3-3 2Mbit/s interface plug module（including 75Ω,120Ω）

Both 75Ω-2Mbit/s interface and 120Ω-2Mbit/s interface include two types: double-cable and single-cable. The double-cable one can be connected with 16 2Mbit/s interfaces, and single-cable one can be connected with 8 2Mbit/s interfaces. Whether it is configured as double-cable 16-channel or single-cable 8-channel, the down-lead definition all starts with 1S and 1P.

That is, under 16- channel condition, it is full configured; under 8-channel condition, only first 8 interfaces are used.

- 75Ω-2Mbit/s interface pin description：it is composed of 75Ω D78 plugs and coaxial cables（16 cores forming one cable, i.e., one cable consisting of 16 small coaxial cables）,shown as the following figure. The symbol definition inside it is as follows：*xx-np（s）/1(or 2) y receive（transmit）*. Among them, xx indicates D78 plug terminal code;n indicates code of one certain coaxial cable(totally 16);p indicates ground end of coaxial cable;s indicates signal end of coaxial cable; /1（or 2）indicates the 1st（or 2nd）whole cable（including 16 small coaxial cables）;y indicates one of 16 small coaxial cables with range of 1~16;receive (transmit）indicates input(output) terminals of this equipment. Other indications are to be analogized.

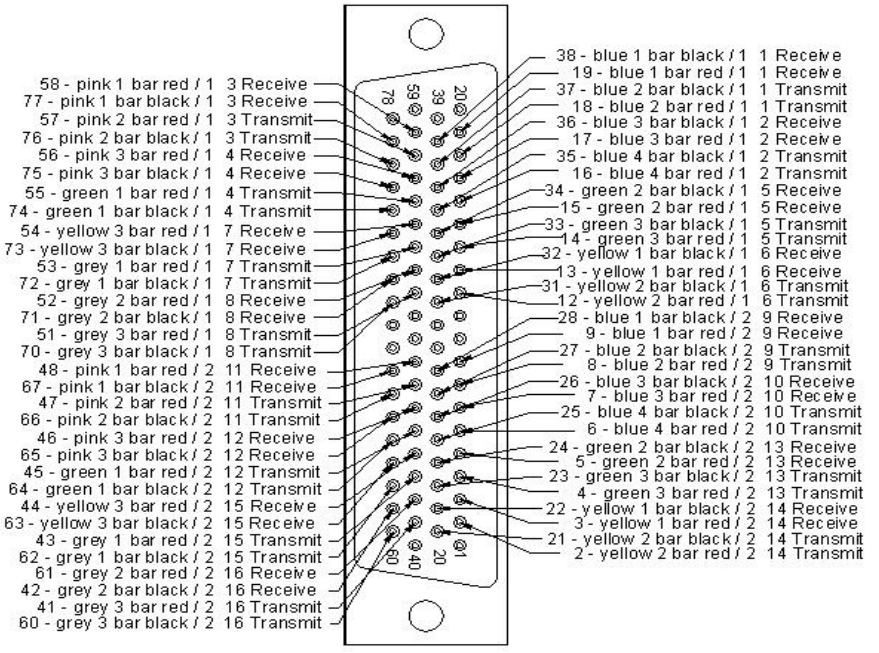

58 - 5s / 1 3 Receive
77 - 5p / 1 3 Receive
57 - 6s / 1 3 Transmit
76 - 6p / 1 3 Transmit
56 - 7s / 1 4 Receive
75 - 7p / 1 4 Receive
55 - 8s / 1 4 Transmit
74 - 8p / 1 4 Transmit
54 - 13s / 1 7 Receive
73 - 13p / 1 7 Receive
53 - 14s / 1 7 Transmit
72 - 14p / 1 7 Transmit
52 - 15s / 1 8 Receive
71 - 15p / 1 8 Receive
51 - 16s / 1 8 Transmit
70 - 16p / 1 8 Transmit
48 - 5s / 2 11 Receive
67 - 5p / 2 11 Receive
47 - 6s / 2 11 Transmit
66 - 6p / 2 11 Transmit
46 - 7s / 2 12 Receive
65 - 7p / 2 12 Receive
45 - 8s / 2 12 Transmit
64 - 8p / 2 12 Transmit
44 - 13s / 2 15 Receive
63 - 13p / 2 15 Receive
43 - 14s / 2 15 Transmit
62 - 14p / 2 15 Transmit
42 - 15s / 2 16 Receive
61 - 15p / 2 16 Receive
41 - 16s / 2 16 Transmit
60 - 16p / 2 16 Transmit
78
59
39
20
60
40
21
1
38 - 1p / 1 1 Receive
19 - 1s / 1 1 Receive
37 - 2p / 1 1 Transmit
18 - 2s / 1 1 Transmit
36 - 3p / 1 2 Receive
17 - 3s / 1 2 Receive
35 - 4p / 1 2 Transmit
16 - 4s / 1 2 Transmit
34 - 9p / 1 5 Receive
15 - 9s / 1 5 Receive
33 - 10p / 1 5 Transmit
14 - 10s / 1 5 Transmit
32 - 11p / 1 6 Receive
13 - 11s / 1 6 Receive
31 - 12p / 1 6 Transmit
12 - 12s / 1 6 Transmit
28 - 1p / 2 9 Receive
9 - 1s / 2 9 Receive
27 - 2p / 2 9 Transmit
8 - 2s / 2 9 Transmit
26 - 3p / 2 10 Receive
7 - 3s / 2 10 Receive
25 - 4p / 2 10 Transmit
6 - 4s / 2 10 Transmit
24 - 9p / 2 13 Receive
5 - 9s / 2 13 Receive
23 - 10p / 2 13 Transmit
4 - 10s / 2 13 Transmit
22 - 11p / 2 14 Receive
3 - 11s / 2 14 Receive
21 - 12p / 2 14 Transmit
2 - 12s / 2 14 Transmit

Definition of 75Ω-2Mbit/s interface plug connection pins(view from sealing side: s indicating coaxial core, while p indicating coaxial external conductor)

Figure 3-4 75Ω-2Mbit/s interface plug connection pins

- 120Ω-2Mbit/s interface terminal description：120Ω-2Mbit/s interface terminal is composed of D78 plug and balanced

cables（one balanced big cable consists of 16 pairs of twists, totally 32 cores）,as the following figure. The symbols inside it are defined as follows: *xx-color n bar black（red）/1(or 2) y receive（transmit）*. xx indicates D78 plug pin code;color indicates twist color（blue,pink,green,yellow,grey）;n bar indicates numbers of bar;black（red）indicates color division of bars at one same twist; /1（or 2）indicates 1st（or 2nd）whole balanced cable（including 16 pairs of twists）;y indicates one pair of 16 pairs with range of 1~16;receive（transmit）indicates twist input/output terminal of this equipment. Other indications are to be analogized.


58 - pink 1 bar red / 1 3 Receive
77 - pink 1 bar black / 1 3 Receive
57 - pink 2 bar red / 1 3 Transmit
76 - pink 2 bar black / 1 3 Transmit
56 - pink 3 bar red / 1 4 Receive
75 - pink 3 bar black / 1 4 Receive
55 - green 1 bar red / 1 4 Transmit
74 - green 1 bar black / 1 4 Transmit
54 - yellow 3 bar red / 1 7 Receive
73 - yellow 3 bar black / 1 7 Receive
53 - grey 1 bar red / 1 7 Transmit
72 - grey 1 bar black / 1 7 Transmit
52 - grey 2 bar red / 1 8 Receive
71 - grey 2 bar black / 1 8 Receive
51 - grey 3 bar red / 1 8 Transmit
70 - grey 3 bar black / 1 8 Transmit
48 - pink 1 bar red / 2 11 Receive
67 - pink 1 bar black / 2 11 Receive
47 - pink 2 bar red / 2 11 Transmit
66 - pink 2 bar black / 2 11 Transmit
46 - pink 3 bar red / 2 12 Receive
65 - pink 3 bar black / 2 12 Receive
45 - green 1 bar red / 2 12 Transmit
64 - green 1 bar black / 2 12 Transmit
44 - yellow 3 bar red / 2 15 Receive
63 - yellow 3 bar black / 2 15 Receive
43 - grey 1 bar red / 2 15 Transmit
62 - grey 1 bar black / 2 15 Transmit
61 - grey 2 bar red / 2 16 Receive
42 - grey 2 bar black / 2 16 Receive
41 - grey 3 bar red / 2 16 Transmit
60 - grey 3 bar black / 2 16 Transmit
59
78
39
20
80
40
21
1
38 - blue 1 bar black / 1 1 Receive
19 - blue 1 bar red / 1 1 Receive
37 - blue 2 bar black / 1 1 Transmit
18 - blue 2 bar red / 1 1 Transmit
36 - blue 3 bar black / 1 2 Receive
17 - blue 3 bar red / 1 2 Receive
35 - blue 4 bar black / 1 2 Transmit
16 - blue 4 bar red / 1 2 Transmit
34 - green 2 bar black / 1 5 Receive
15 - green 2 bar red / 1 5 Receive
33 - green 3 bar black / 1 5 Transmit
14 - green 3 bar red / 1 5 Transmit
32 - yellow 1 bar black / 1 6 Receive
13 - yellow 1 bar red / 1 6 Receive
31 - yellow 2 bar black / 1 6 Transmit
12 - yellow 2 bar red / 1 6 Transmit
28 - blue 1 bar black / 2 9 Receive
9 - blue 1 bar red / 2 9 Receive
27 - blue 2 bar black / 2 9 Transmit
8 - blue 2 bar red / 2 9 Transmit
26 - blue 3 bar black / 2 10 Receive
7 - blue 3 bar red / 2 10 Receive
25 - blue 4 bar black / 2 10 Transmit
6 - blue 4 bar red / 2 10 Transmit
24 - green 2 bar black / 2 13 Receive
5 - green 2 bar red / 2 13 Receive
23 - green 3 bar black / 2 13 Transmit
4 - green 3 bar red / 2 13 Transmit
22 - yellow 1 bar black / 2 14 Receive
3 - yellow 1 bar red / 2 14 Receive
21 - yellow 2 bar black / 2 14 Transmit
2 - yellow 2 bar red / 2 14 Transmit

Definition of 120Ω-2Mbit/s interface plug connection pins(view from sealing side)

Figure 3-5 120Ω-2Mbit/s interface plug connection pins

Table 3-1 75Ω connection wire modules

Cable code	Core code		Terminal code	2Mbit/s end name	Cable code	Core cable code		Terminal code	2Mbit/s end name
Cable 1	#1	Shield wire	38	GND	Cable 2	#1	Shield wire	28	GND
		Core wire	19	1 in			Core wire	9	9 in
	#2	Shield wire	37	GND		#2	Shield wire	27	GND
		Core wire	18	1 out			Core wire	8	9 out
	#3	Shield wire	36	GND		#3	Shield wire	26	GND
		Core wire	17	2 in			Core wire	7	10 in
	#4	Shield wire	35	GND		#4	Shield wire	25	GND
		Core wire	16	2 out			Core wire	6	10 out
	#5	Shield wire	77	GND		#5	Shield wire	67	GND
		Core wire	58	3 in			Core wire	48	11 in
	#6	Shield wire	76	GND		#6	Shield wire	66	GND
		Core wire	57	3 out			Core wire	47	11 out
	#7	Shield wire	75	GND		#7	Shield wire	65	GND
		Core wire	56	4 in			Core wire	46	12 in
	#8	Shield wire	74	GND		#8	Shield wire	64	GND
		Core wire	55	4 out			Core wire	45	12 out
	#9	Shield wire	34	GND		#9	Shield wire	24	GND
		Core wire	15	5 in			Core wire	5	13 in
	#10	Shield wire	33	GND		#10	Shield wire	23	GND
		Core wire	14	5 out			Core wire	4	13 out
	#11	Shield wire	32	GND		#11	Shield wire	22	GND
		Core wire	13	6 in			Core wire	3	14 in
	#12	Shield wire	31	GND		#12	Shield wire	21	GND
		Core wire	12	6 out			Core wire	2	14 out
	#13	Shield wire	73	GND		#13	Shield wire	63	GND
		Core wire	54	7 in			Core wire	44	15 in
	#14	Shield wire	72	GND		#14	Shield wire	62	GND
		Core wire	53	7 out			Core wire	43	15 out
	#15	Shield wire	71	GND		#15	Shield wire	61	GND
		Core wire	52	8 in			Core wire	42	16 in
	#16	Shield wire	70	GND		#16	Shield wire	60	GND
		Core wire	51	8 out			Core wire	41	16 out

Table 3-2 120Ω connection wire module

Cable code	Wire color	Terminal code	2Mbit/s end name	Cable code	Wire color	Terminal code	2Mbit/s end name
Cable 1	Blue 1 bar-black	38	1 in	Cable 2	Blue 1 bar--black	28	9 in
	Blue 1 bar--red	19			Blue 1 bar--red	9	
	Blue 2 bar--black	37	1 out		Blue 2 bar--black	27	9 out
	Blue 2 bar--red	18			Blue 2 bar--red	8	
	Blue 3 bar--black	36	2 in		Blue 3 bar--black	26	10 in
	Blue 3 bar--red	17			Blue 3 bar--red	7	
	Blue 4 bar--black	35	2 out		Blue 4 bar--black	25	10 out
	Blue 4 bar--red	16			Blue 4 bar--red	6	
	Pink 1 bar--black	77	3 in		Pink 1 bar--black	67	11 in
	Pink 1 bar--red	58			Pink 1 bar--red	48	
	Pink 2 bar--black	76	3 out		Pink 2 bar--black	66	11 out
	Pink 2 bar--red	57			Pink 2 bar--red	47	
	Pink 3 bar--black	75	4 in		Pink 2 bar--black	65	12 in
	Pink 3 bar--red	56			Pink 3 bar--red	46	
	Green 1 bar--black	74	4 out		Green 1 bar--black	64	12 out
	Green 1 bar--red	55			Green 1 bar--red	45	
	Green 2 bar--black	34	5 in		Green 2 bar--black	24	13 in
	Green 2 bar--red	15			Green 1 bar--red	5	
	Green 3 bar--black	33	5 out		Green 3 bar--black	23	13 out
	Green 3 bar--red	14			Green 3 bar--red	4	
	Yellow 1 bar -black	32	6 in		Yellow 1 bar -black	22	14in
	Yellow 1 bar -red	13			Yellow 1 bar -red	3	
	Yellow 2 bar -black	31	6 out		Yellow 1 bar -black	21	14 out
	Yellow 2 bar -red	12			Yellow 2 bar -red	2	
	Yellow 3 bar -black	73	7 in		Yellow 1 bar -black	63	15 in
	Yellow 3 bar -red	54			Yellow 3 bar -red	44	
	Grey 1 bar -black	72	7 out		Grey 1 bar -black	62	15 out
	Grey 1 bar -red	53			Grey 1 bar -red	43	

Cable code	Wire color	Terminal code	2Mbit/s end name	Cable code	Wire color	Terminal code	2Mbit/s end name
	Grey 2 bar -black	71	8 in		Grey 2 bar -black	61	16 in
	Grey 2 bar -red	52			Grey 2 bar -red	42	
	Grey 3 bar -black	70	8 out		Grey 3 bar -black	60	16 out
	Grey 3 bar -red	51			Grey 3 bar -red	41	

Ground

The main purpose of grounding is: first, security of personnel and equipment; second, for EMI protection.

- For DC power supply,positive pole must be grounded perfectly.
- Before detecting this equipment with instruments, if equipment is installed inside cabinet, users must first connect instrument crust ground end with cabinet bottom ground end perfectly. If equipment is laid on table or hung on wall, users must connect instrument crust ground end with equipment ground modules perfectly.
- When performing internal operation for equipment or its connection ports, please wear antistatic wrist strap, whose ground wire should be connected with ground of cabinet or equipment.

3.3 Equipment Start-up

After equipment installation is completed, users can start up it. As for start-up, there are two operation modes:

1. Manual mode：

When this equipment is used for point-to-point or simple ring

service, user can directly start up it manually. That is, only set corresponding switches inside system card while not use network management system.

2. Network management system mode：

When it is used to complex networking applications, users need to use network management system for configuration of add/drop time slots, clock reference direction and protection type, etc. Under this condition, the switches must be set as Network Management Start-up. For setting of IP address, network block code and network element code, etc., users can perform that through dialing or EOT.

4 Network Management

This equipment is of single-board type. For it, EMU unit is installed on system card with subcard mode.The EMU of this equipment is SMU type with frame type of IBAS110A.For convenience of operation on network management system, when users click the present cards inside OTNM2000 card view with left button, the choosen card will be dispayed in special color.The command tree of this card is indicated on the right-top part of objece view diagram.Command tree is card operation menu,whose items vary with different cards. Commonly, it includes the following contents:present alarm, alarm history, performance, performance history,condition, configuration, act configuration, card command,etc.The top left part of view displays operation items of menu(default as present alarm information of card) . For observation operation, all grades of users are permitted.For exmple, if you want to check alarm, performance or condition data of one certain card, you only need to click corresponding items, and the correponding frame can be displayed.But for configuration and card commands, only the users who have certain grades can enter the corresponding command windows.In this chapter, we mainly introduce euipment management methods with OTNM2000.The main contents are as follows:

- 155Mbit/s system card（S155）
- 155Mbit/s optical interface card（O155）
- 4-channel fast Ethernet switch transparent transmission card （ESD1）
- 4-channel Ethernet switch card（ESW4）

- 4-channel Ethernet transparent transmission card（ETH4）
- 2Mbit/s interface card（E1）

Other cards to be developed will be introduced and described in user manuals of new versions.

4.1 155Mbit/s System Card（S155）

Two 155Mbit/s system cards should be configured in network management system, respectively being SMU and S155.

4.1.1 S155 Card Configuration

Basic configuration

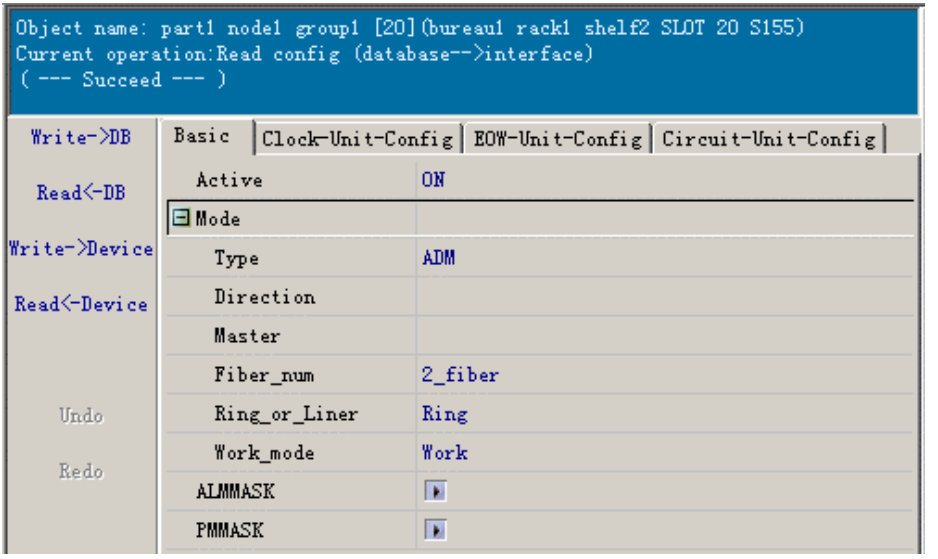
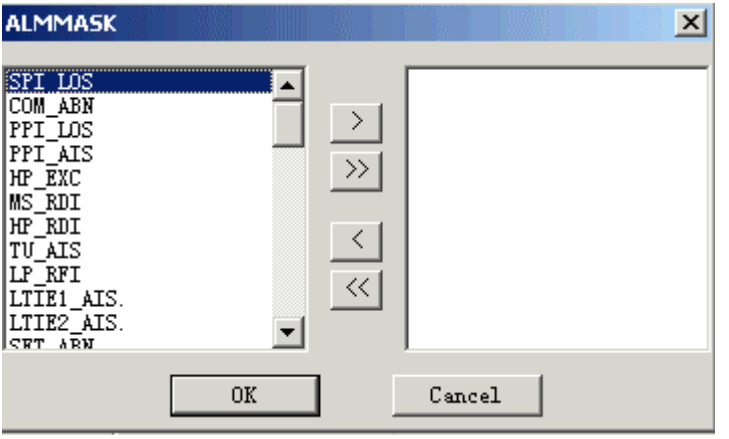


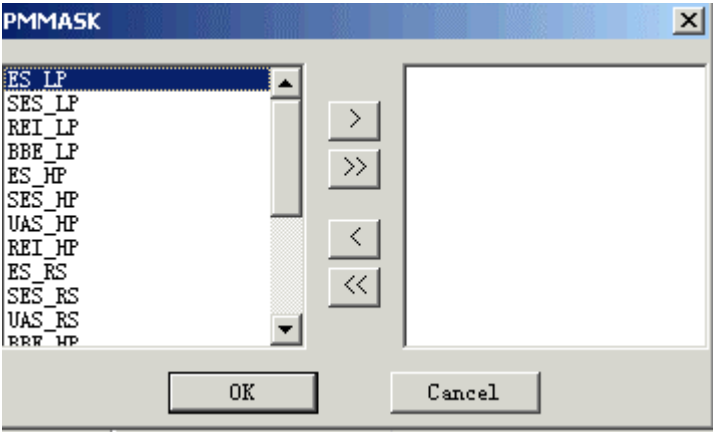
Figure 4-1 Basic configuration window of S155 card

Mode：Equipment types include ADM, TM, REG. It is usually selected as ADM,while it can be configured as TM when it is used as terminal.

Alarm and performance mask

Click button ▸ at right of “ALARMMASK” or “PMMASK”, and alarm mask or performance mask dialog box will be ejected as the following figure:





In the dialog boxes, left is code to be masked and right is masked code. All masked alarm/performance codes can not be seen on

network management interface.

Click > button, then the selected code is sent to right box. Click "OK" button, then this code is masked.

Click >> button,then all codes are sent to right box. Click "OK" button, then they are all masked.

Clicking < and << is contradictory operation of above buttons. That is, resume the masked code to non-mask conditions.

Clock unit configuration

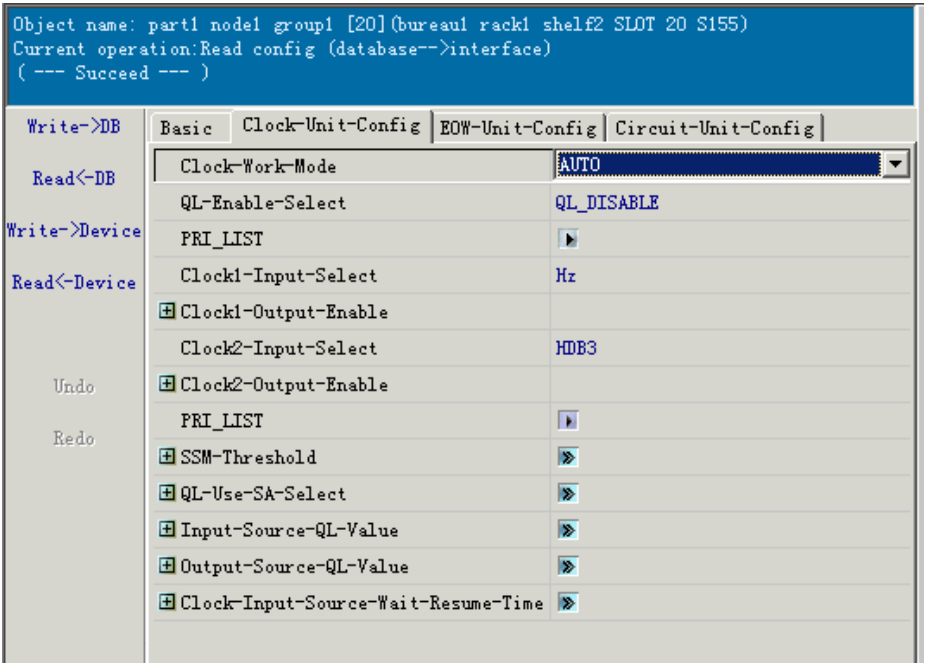


Figure 4-2 Clock unit configuration window of S155 card

Clock work mode

It has three modes: free running mode, auto mode, hold over mode.

Under auto mode, if there exists selection source meeting requirement, clock card will enter lock-up conditions. If present clock sources are all interrupted, and it alredy has been locked before interruption, clock card will enter hold over mode. If it is not locked, clock card will enter free running mode.

QL enable select

----QL enable：it activates SSM(Synchronization Status Message)function,and performs clock input/output source processing. At this time, when clock card selects lock source, it only considers listed input source. It shall select highest grade clock source according to QL value. If any two sources have same QL value, the card shall select the clock source with high PRI according to PRI list to act as reference source. At the same time, it gives each output source its special SSM grade.

----QL disable：The SSM function is not in activation status. Under this condition, clock card only selects the sources with highest grade PRI to act as clock-up source but does not considers their SSM grades.

PRI list

Click button ▶ in right side of “PRI- list” to eject PRI -list box. The input source at top of “end” is effective selected source. Their PRIs are arranged from the top down. Double-click one certain input source with mouse left key, and then this input source shall be changed into the 1st selected source.

Clock input selection：it is of HDB3,Hz types.

Clock output enable

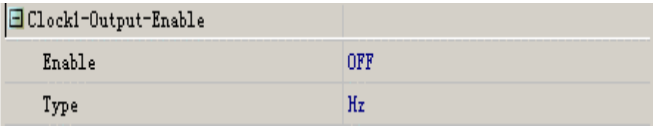


Figure 4-3 Clock output enable configuration

Enable：switches on external clock output signal.

Type：external clock output signal adopts Hz or HDB3 modes.

SSM threshold

SSM is used to transfer quality grade of timing signals inside synchronization timing chain. There are 6 grades totally, respectively being: G811, unknown, G812Trans, G812Local, G813 and Not-Synchronization. The arrangement is: G811 > unknown> G812Trans > G812Local > G813 > Not-Synchronization. It is required that QL grade of external clock output source is higher than that of external clock SSM threshold value. Otherwise, if clock output is of HDB3 type, external output status is AIS; if clock output is of Hz type, external output status is disable.

There are two modes for SSM threshold setting. Mode 1 is shown as the following figure: click button at right side of SSM-threshold with mouse left key, then tributary mask dialog box will be ejected as shown in Configuration Mode 1 figure . Select the items needed to be set up in “choice item” at left side boxes, click and add them into “item to be modified” at right side box, then fill “input value to

modify". Click "modify" button, and then users can carry out setting operation to selected items.

Mode 2: users also can click the items needed to be modified in the pulldown menu of items with mouse at items below SSM threshold for modification. The operation is shown as Configuration Mode 2 figure. Others are similar.

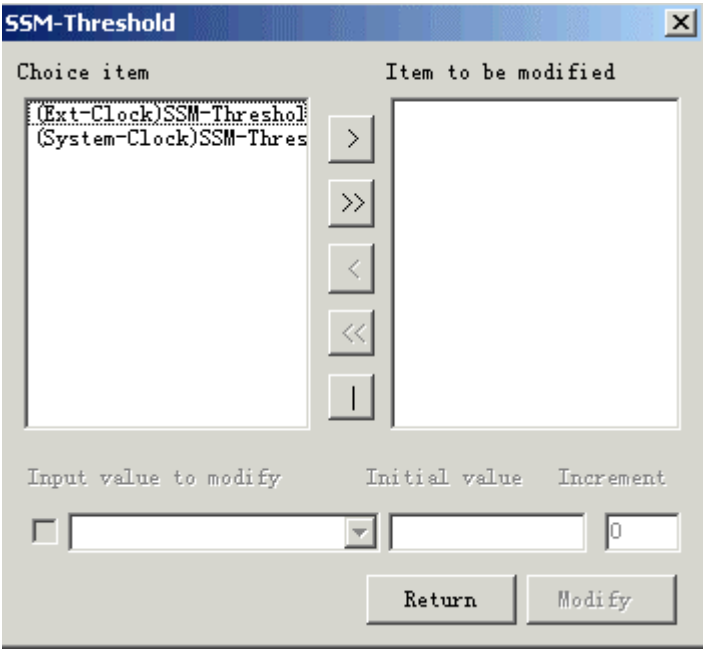


Figure 4-4 Configuration mode 1of SSM threshold

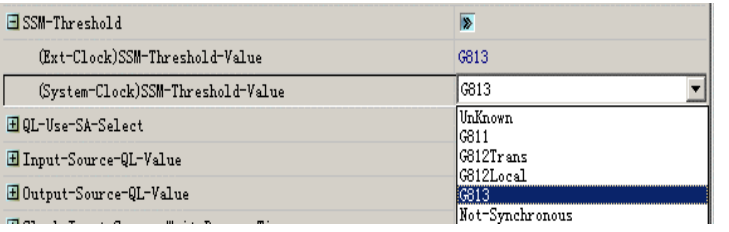


Figure 4-5 Configuration mode 2 of SSM threshold

(Ext-Clock) SSM- Threshold-Value: it is used to set threshold of equipment external clock reference source select device. If all provided references are below this value, the external clock output will be switched off.

(System-Clock) SSM-Threshold-Value: it is used to set threshold of equipment system clock reference source select device. If all provided references are below this value, the system clock output will enter maintenance status.

QL- use- SA- select

QL- use- SA- select is for external clock HDB3（external clock Hz does not bear SSM information）.For external HDB3, any one of the 4th –8th bits inside TS0 time slot whose code is odd in multiple frame is used to transfer SSM information. The equipment can perform configuration to QL- use- SA- select. They can be sorted as input- source- SA –select configuration and output- source -SA select configuration. They can be configured as SA4, SA5,SA6,SA7 and SA8,respectively corresponding to 4th-8th bits of TS0 time slots. The default value is SA4.

When input- source- SA –select configuration is one of SA4～SA8, this indicates that external clock HDB3 can obtain SSM information from the corresponding bit of TS0 time slot. When output –source- SA select configuration is one of SA4～SA8, this indicates that output external clock HDB3 will write SSM information to the corresponding bit of TS0 time slot

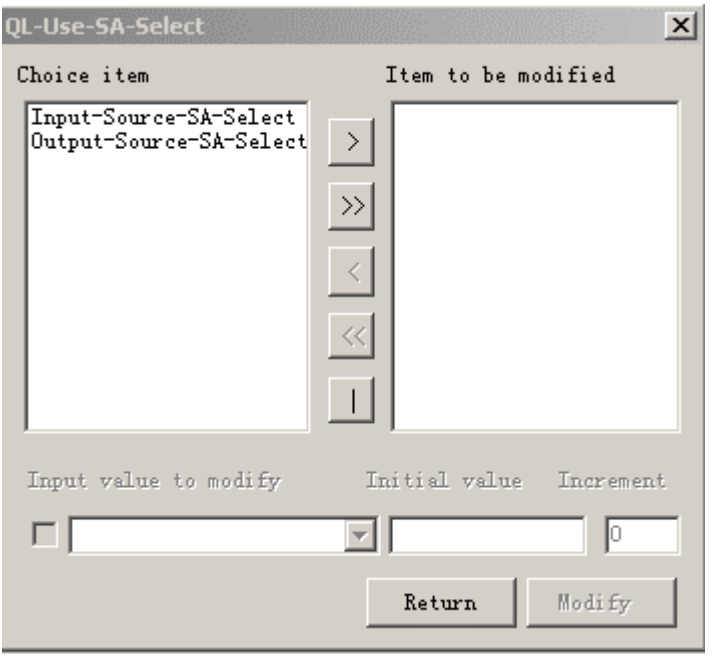


Figure 4-6 Configuration mode 1 with QL-Use- SA -Select

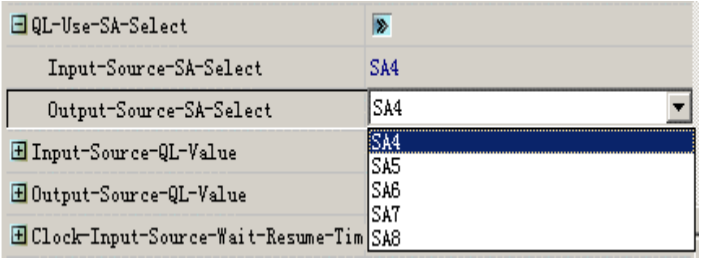


Figure 4-7 Configuration mode 2 with QL –Use- SA -Select

Input -Source -QL -Value

There are 6 grades of Input -Source -QL -Value totally, respectively being: G811, unknown, G812 Trans, G812 Local, G813 and Not-

Synchronous. The arrangement is: G811 > unknown> G812 Trans > G812 Local > G813 > Not- Synchronous. The input source includes external clock, tributaries 1-4 and aggregation side. There are two methods for Input- Source- QL- Value configuration. The default is Auto-Pick-S1.

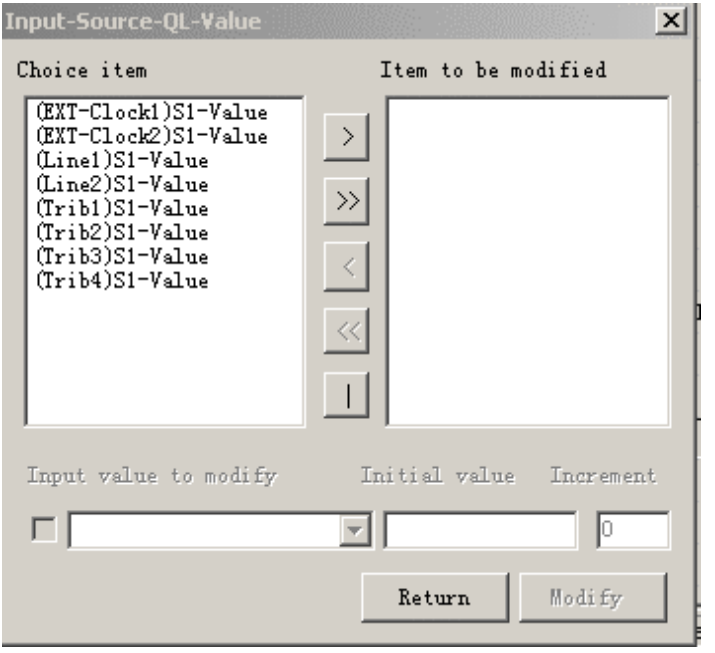


Figure 4-8 Configuration mode 1 of Input- Source- QL -Value

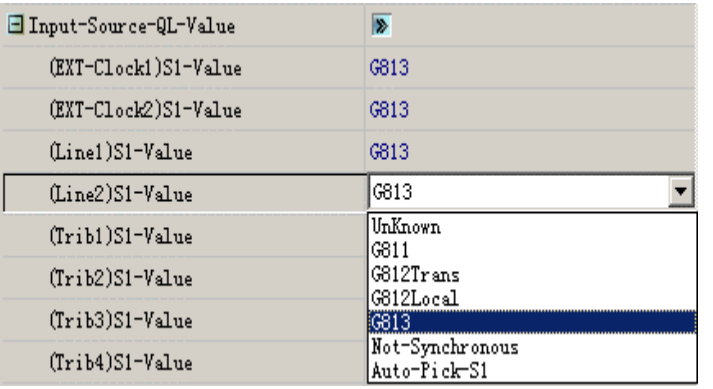


Figure 4-9 Configuration mode 2 of Input- Source- QL- Value

Output- Source- QL-value configuration

The configurable output source has the same QL value as that of input source. Output source includes external clocks 1-2,lines 1-2 and tributaries 1～4.The configuration methods also include two types, which are the same as that of input source QL as shown in the following figure .The default value is Auto-Pick -S1.

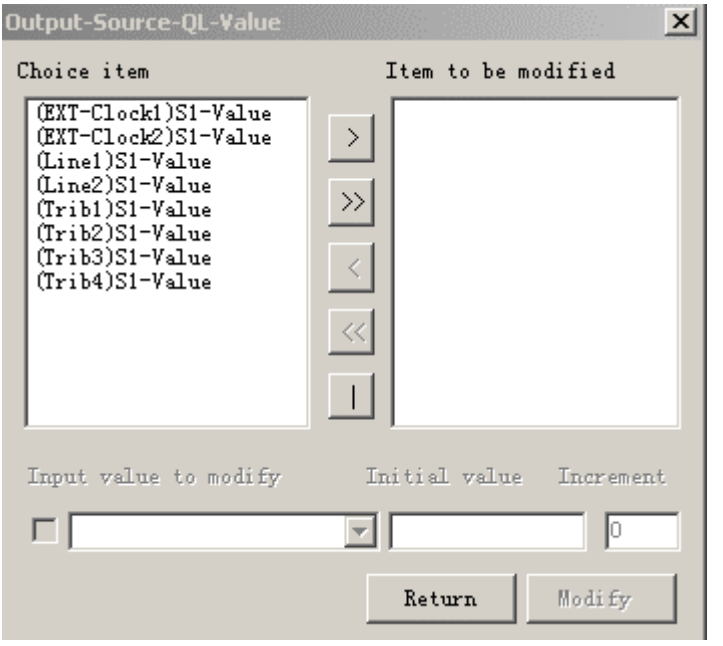


Figure 4-10 Configuration mode 1 of Output -Source –QL-Value

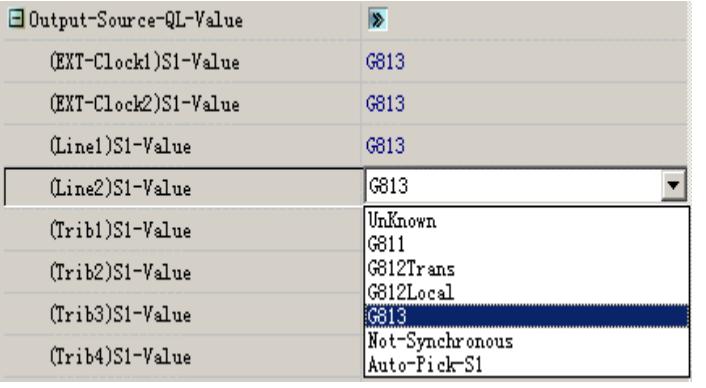


Figure 4-11 Configuration mode 2 of Output -Source –QL-Value

Clock- Input –Source- Wait- Resume- Time

It is used to configure resume time after loss of different clock sources.

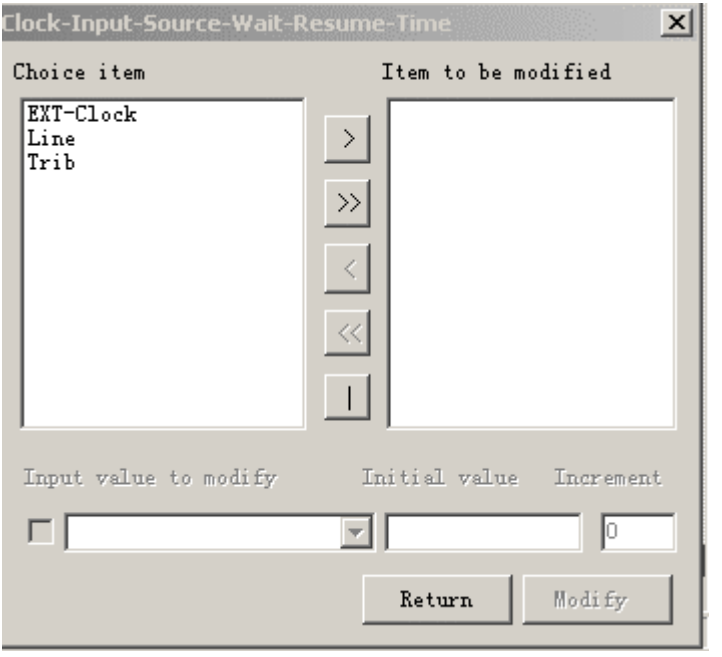


Figure 4-12 Configuration mode 1 of Clock- Input- Source- Wait –Resume- Time

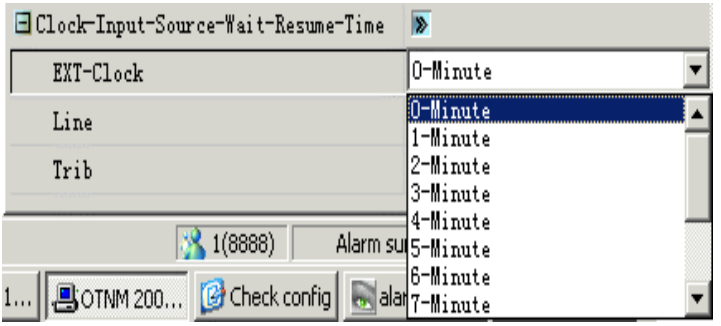


Figure 4-13 Configuration mode 2 of Clock- Input- Source- Wait- Resume- Time

EOW unit configuration

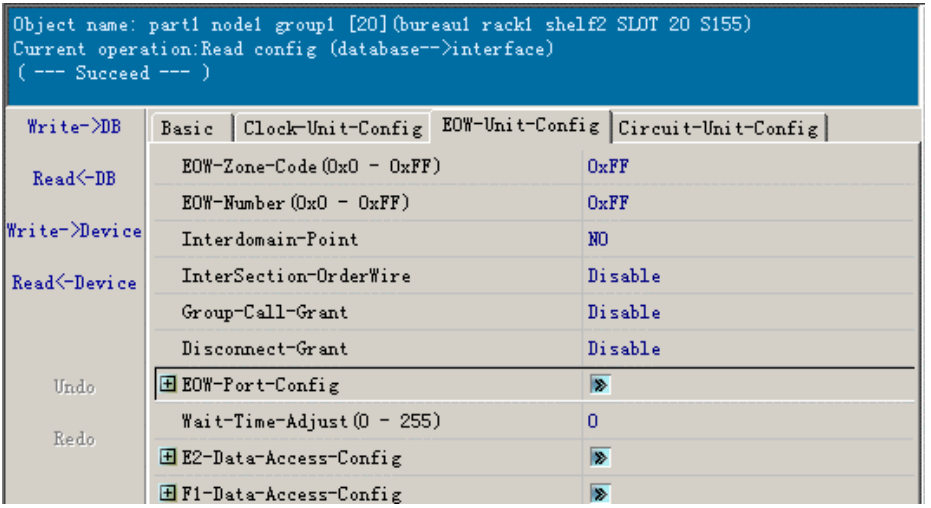


Figure 4-14 Configuration window of S155 card EOW unit

Eow-Zone-Code and EOW-Number：They are configured as one 4-digit decimal code. For EOW-1 protocol, it must be configured according to code rules. While for EOW-2 protocol, it is only

requested that the 4 digits are different with each other inside network.

Interdomain-Point: Used for part configuration inside network to restrain broadcast storm. Under common conditions, it can adopt default value.

InterSection-OrderWire： For configuration of permission to use inter-section order wire.

Group-Call-Grant：for configuration of permission to use group call authorization.

Disconnect-Grant：for configuration of permission to use forced disconnection authorization.

EOW-Port configuration

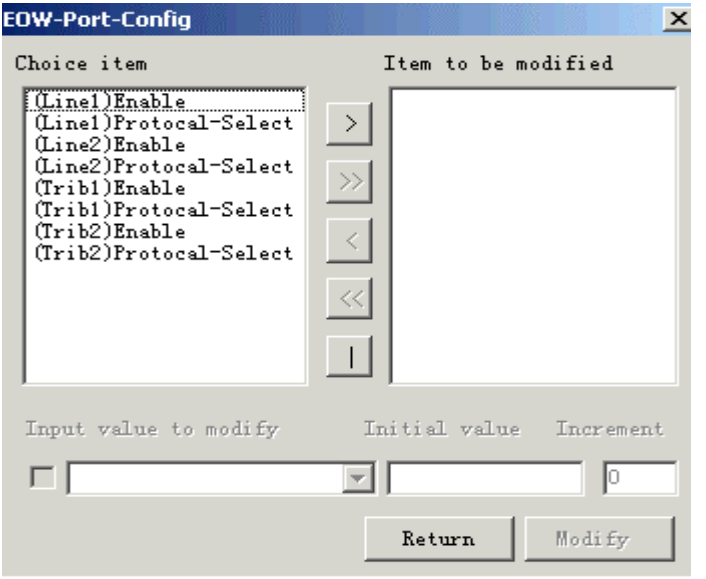


Figure 4-15 Configuration mode 1 of Eow- Port

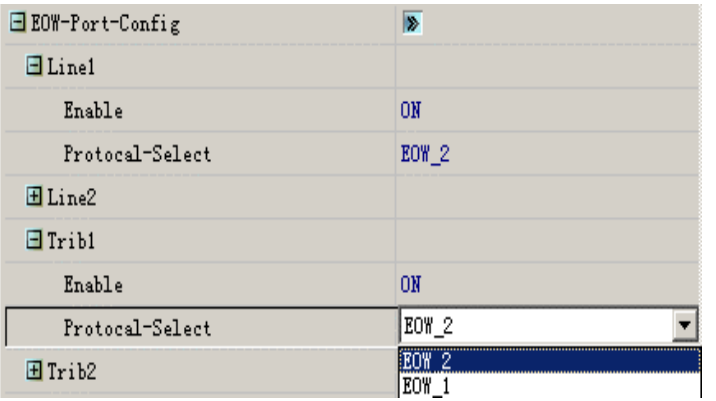


Figure 4-16 Configuration mode 2 of EOW-Port

Enable：It is for configuration of line 1-2 connection or order wire E1 channel connection in extension tributary 1-2 optical direction.

Protocol selection： It is used to set order wire protocol of corresponding optical direction to determine whether it is EOW-1 or EOW-2 protocol. For EOW-1 protocol, users should configure order wire codes according to code rules. While for EOW-2 protocol, it does not need special code rules. At present, EOW-2 protocol is commonly used.

E2- Data -Access configuration

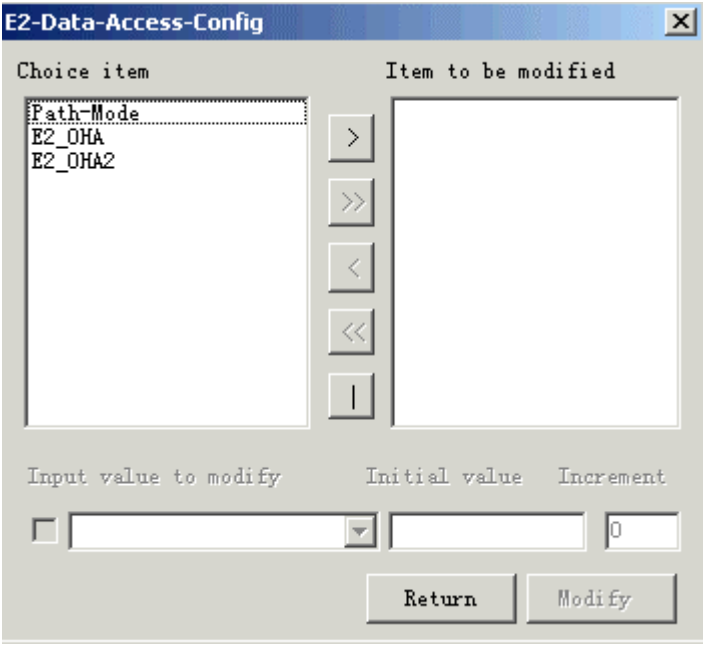


Figure 4-17 Configuration mode 1 of E2- Data -Access

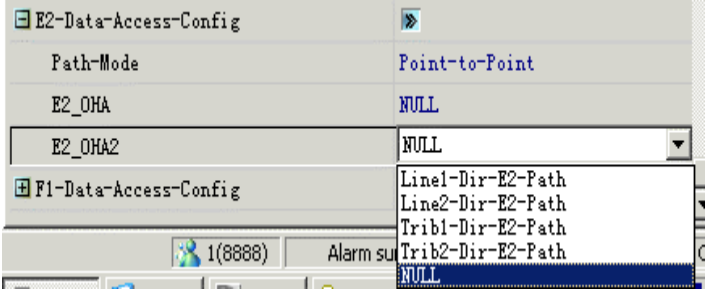


Figure 4-18 Configuration mode 2 of E2- Data -Access

Under point-to-point mode, users can access E2 channel of line 1-2 or 1-2 optical direction of extension tributary through configuration of E2_OHA1 and E2_OHA2 ports.

Under bus mode,various optical directions ,E2_OHA1 and E2_OHA2 access ports are all of one same bus,and they can receive output signals in any directions except for local directions.

F1- Data -Access configuration

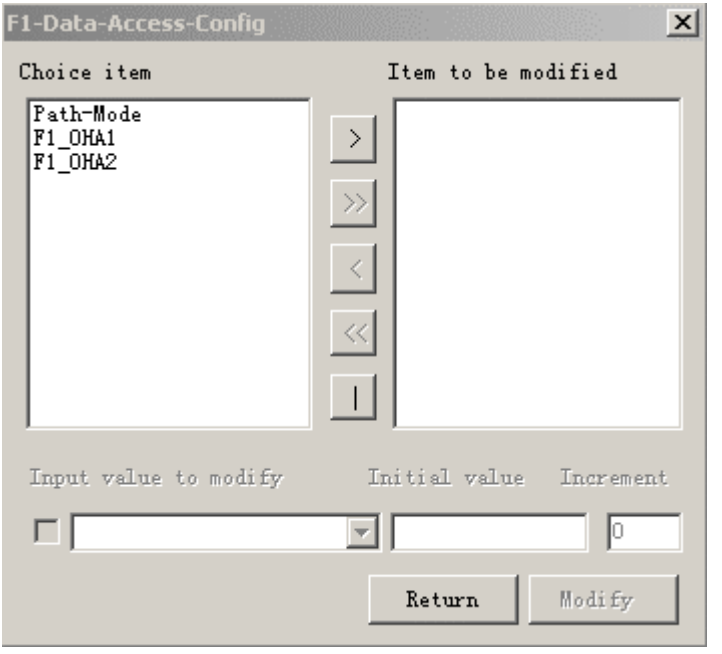


Figure 4-19 Configuration mode 1 of F1- Data- Access

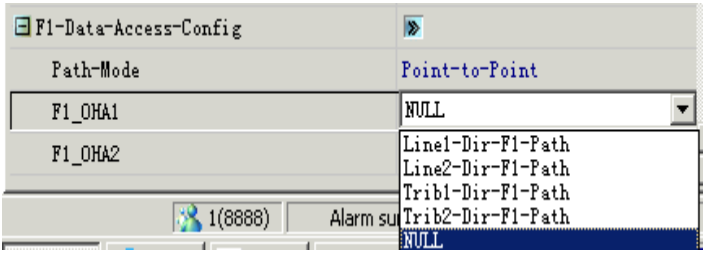


Figure 4-20 Configuration mode 2 of F1- Data -Access

Under point-to-point mode, users can access E2 channel of line 1-2 or 1-2 optical direction of extension tributary through configuration of E2_OHA1 and E2_OHA2 ports.

Under bus mode,various optical directions ,E2_OHA1 and E2_OHA2 access ports are all of one same bus,and they can receive output signals in any directions except for local directions.

Circuit unit configuration

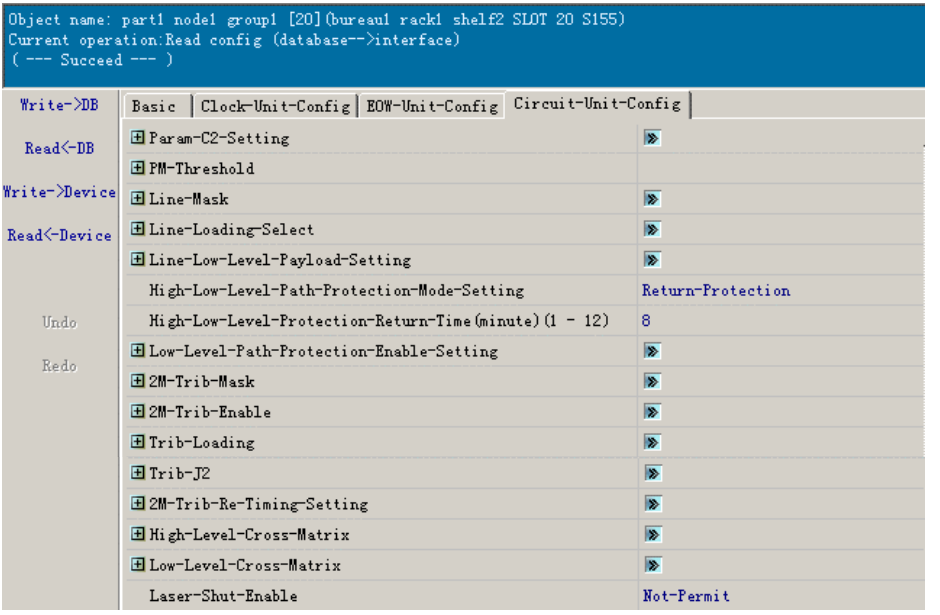


Figure 4-21 Circuit unit configuration window

The detailed items of various items inside circuit unit configuration are shown as follows:

DCC-Select	»
Line1	DCCR
Line2	DCCR
Line-1-J0	»
Send-CRC(0x0 - 0xFF)	0xFD
Send-Data	223334444555555
Expect-Receive-CRC(0x0 - 0xFF)	0xFD
Expect-Receive-Data	223334444555555
Line-2-J0	»
Send-CRC(0x0 - 0xFF)	0xFD
Send-Data	223334444555555
Expect-Receive-CRC(0x0 - 0xFF)	0xFD
Expect-Receive-Data	223334444555555

DCC -Select：It is used for configuration of line1-2 to determine whether DCCR or DCCM channel is used for management channel.

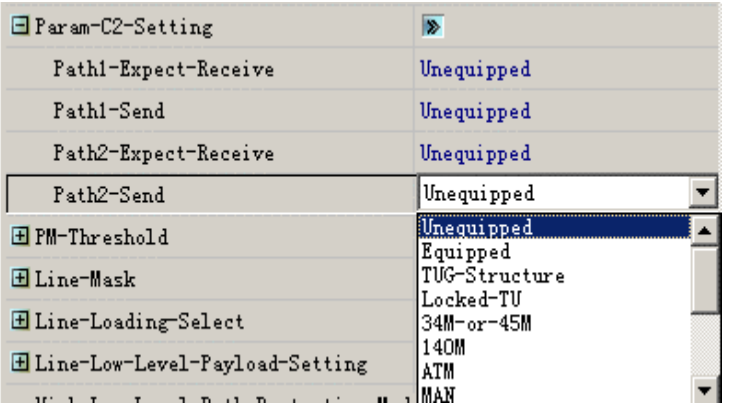
Line-1-J0：It is used to set J0 series transmitted from line1 and expected to be received by line1.

Line-2-J0：It is used to set J0 series transmitted from line2 and expected to be received by line2.

Path-1-J1	»
Send-CRC(0x0 - 0xFF)	0xFD
Send-Data	223334444555555
Expect-Receive-CRC(0x0 - 0xFF)	0xFD
Expect-Receive-Data	223334444555555
Path-2-J1	»
Send-CRC(0x0 - 0xFF)	0xFD
Send-Data	223334444555555
Expect-Receive-CRC(0x0 - 0xFF)	0xFD
Expect-Receive-Data	223334444555555

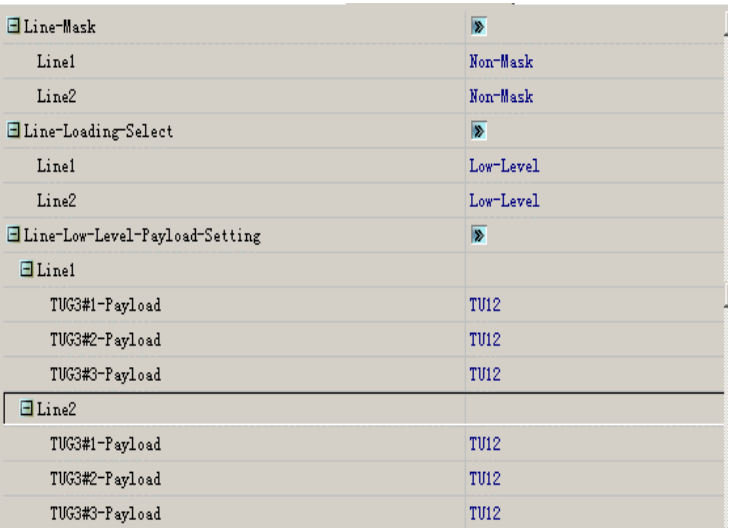
Path-1-J1：It is used to set J1 series transmitted and expected to be received by VC4 path inside line1.

Path-2-J1：It is used to set J1 series transmitted and expected to be received by VC4 path inside line2.



Param-C2-Setting: It is used to set signals transmitted and expected to be received by VC4 paths inside line1 and line2 respectively..

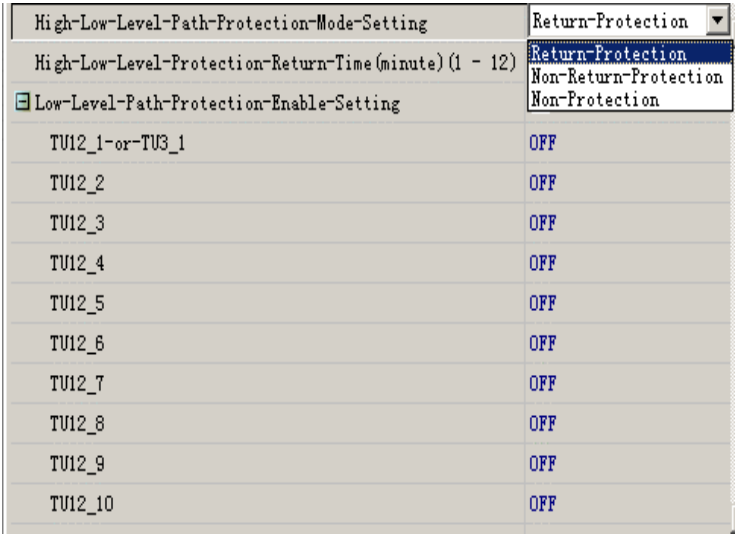
Performance threshold：it is used to set B2 error statistics, which produces performance threshold value of SD_Es and SES.



Line- Mask：It is used to set whether users should mask alarm and performance report of line 1 or 2.

Line- Loading- Select：It is used to set VC4 of STM-1 line 1 and 2 are loaded with either high level VC-4 or low level VC3/VC12 services.

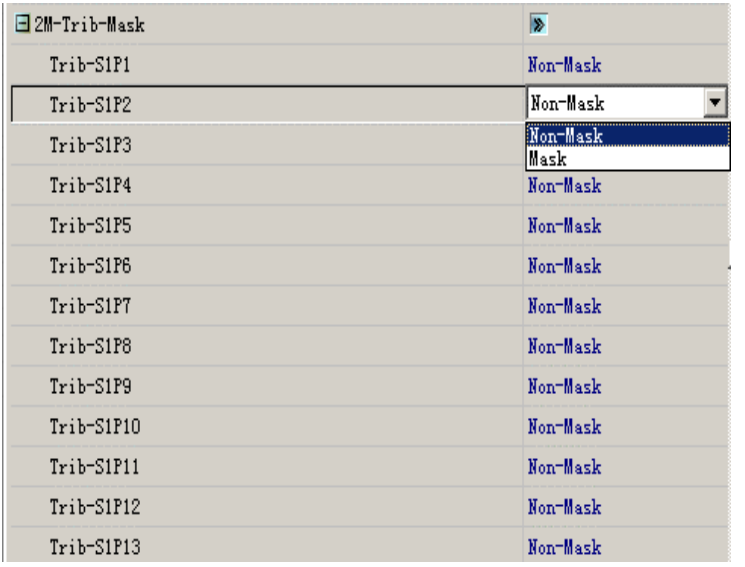
Line- Low- Level- Payload- Setting：It is used to set the three TUG3s of VC4 are loaded with either TU3 or TU12 when STM-1 line 1 and 2 are used as low level ones.



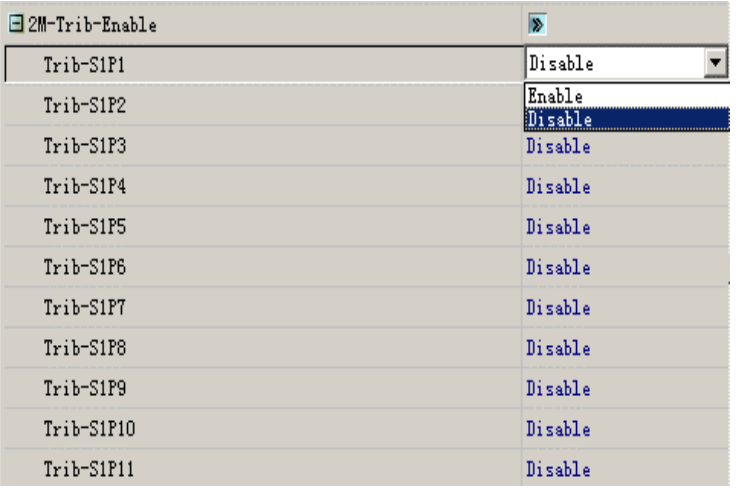
High- Low- Level-Path- Protection- Mode- Setting：It is used to configure performance mode of path protection.

High- Low- Level-Path- Protection- Return- Time：It is used to configure resume wait time of path protection.

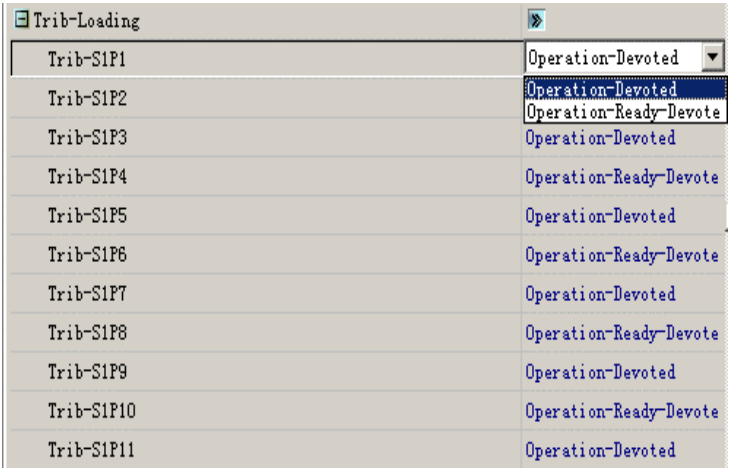
Low-Level- Path- Protection- Enable- Setting：It is used to configure start-up or close of protection function of each protected low level path.



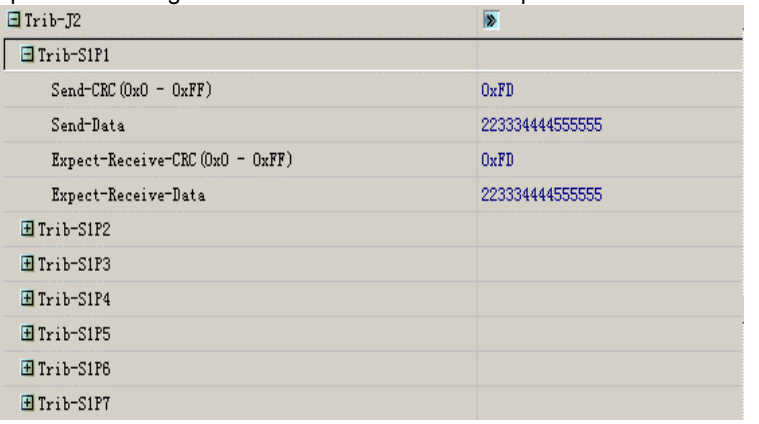
2M- Trib- Mask：This is used to determine if 32 2Mbit/s tributaries report their alarms and performances.



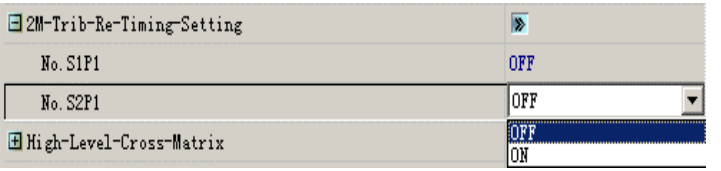
2M- Trib- Enable：This is used to determine whether 32 2Mbit/s tributaries are started up. If one certain tributary is not used, it gives output AIS.



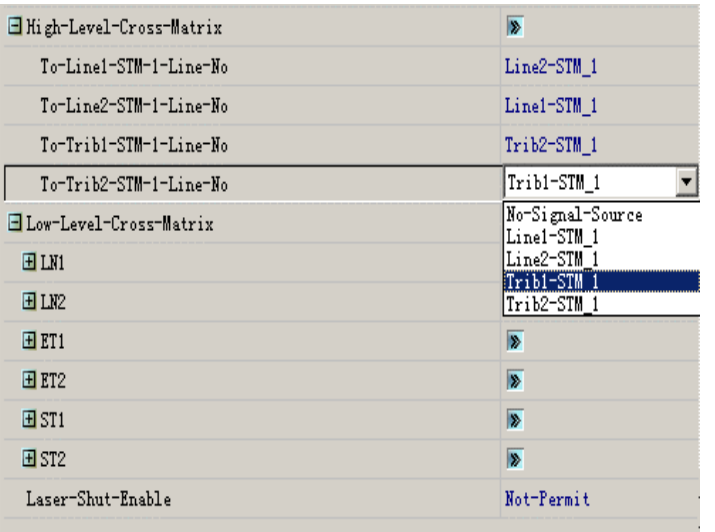
Trib- Loading：It is used to configure if 32 2Mbit/s tributaries inside card have operation to devote. For Operation -Devoted, PPI-LOS will give normal alarm. For Operation –Ready- Devoted, PPI-LOS will give no alarm. But if there is operation to devote, equipment will give operation loading alarm to ask user to set it as “Operation -Devoted”.



Trib- J2：It is used to configure J2 series transmitted from and expected by 32 lower order paths of tributary.



2M- Trib- Re-Timing -Setting：It is used to configure equipment S1P1 and S2P1 tributary start-up and close of 2M re-timing functions.



High-Level- Cross- Matrix：It is used to configure higher order cross-connect based on VC4 between lines 1-2 and extension tributaries 1-2. This configuration is usually performed through node cross GUI and not performed with card configuration here.

Low-Level- Cross- Matrix：it is used to configure 6×6 lower order cross-connect based on VC3/VC12 inside equipment. This configuration is usually performed through node cross GUI and not performed with card configuration here.

Laser- Shut- Enable：It is used to control line shut-off function for providing system test.

4.1.2 S155 Card Control Command

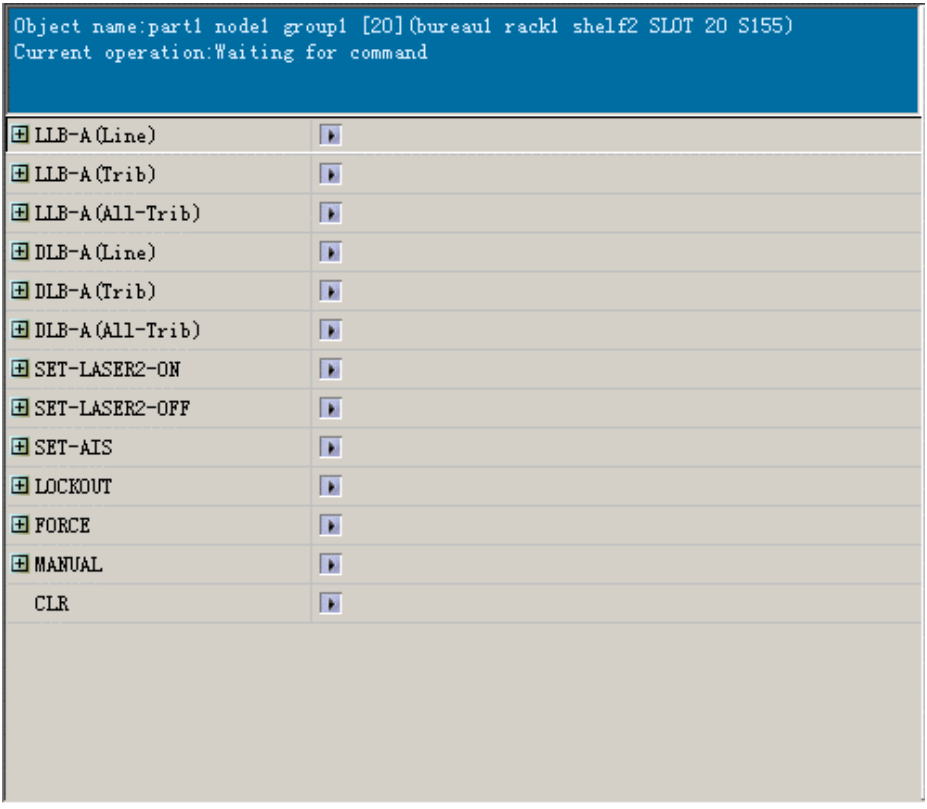
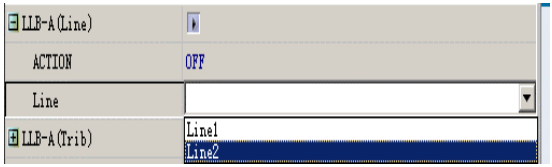
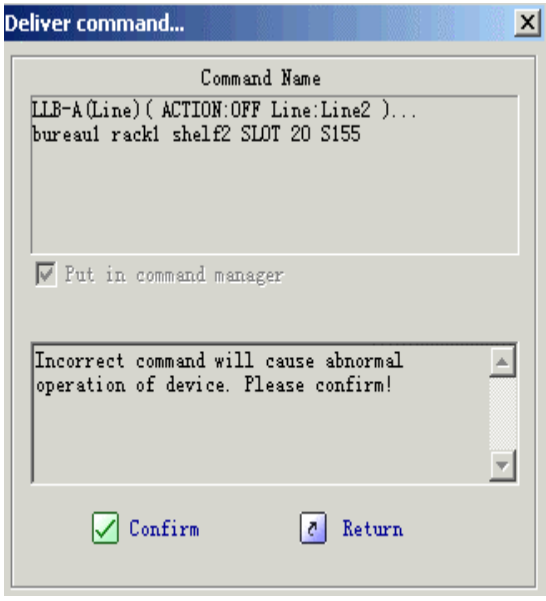


Figure 4-22 S155 card control command window

Click spread button ⊞ at left side of selective item inside control command with left button of the mouse, select corresponding lines in pulldown menu, then click ▸ in right side,and to eject the deliver command window then click “confirm” . We shall give an example for LLB-A (Line) as follows. Others are of similar.


LLB-A(Line)
ACTION
OFF
Line
LLB-A(Trib)
Line1
Line2


Deliver command...
Command Name
LLB-A(Line)(ACTION:OFF Line:Line2)...
bureau1 rack1 shelf2 SLOT 20 S155
Put in command manager
Incorrect command will cause abnormal operation of device. Please confirm!
Confirm
Return

4.1.3 SMU Card Configuration

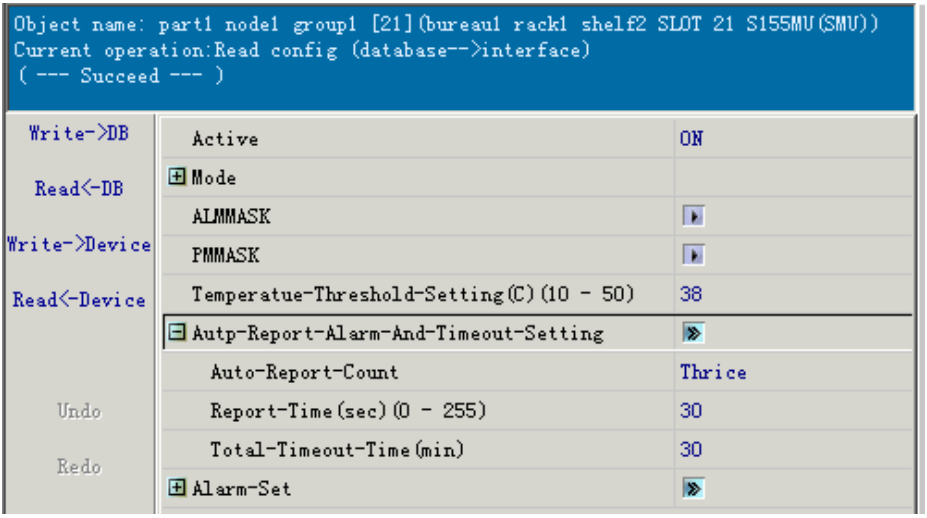


Figure 4-23 SMU card configuration window

Mode：Equipment type includes ADM, TM, REG. This equipment is usually configured as ADM,while can be configured as TM when it acts as terminal.

ALARMMASK and PMMASK：They are similar to that of S155 card,and their configuration method can be referred with S155 card.

Auto-Report-Alarm-And-Timeout-Setting： It adjusts alarm report strategy according to network scale to make network management system fluent and optimum.

Alarm- Set：It is used to configure alarm mask and selection of alarm level.

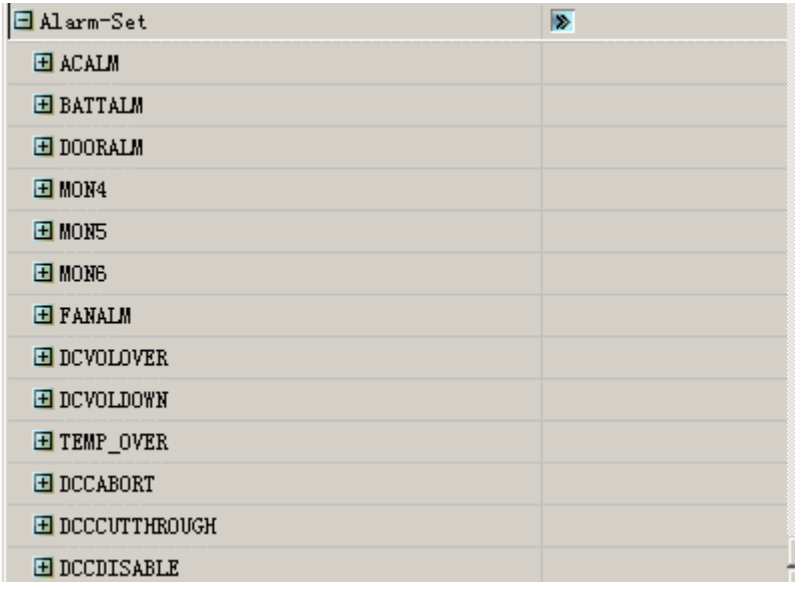


Figure 4-24 Alarm- Set

4.1.4 SMU Card Control Command

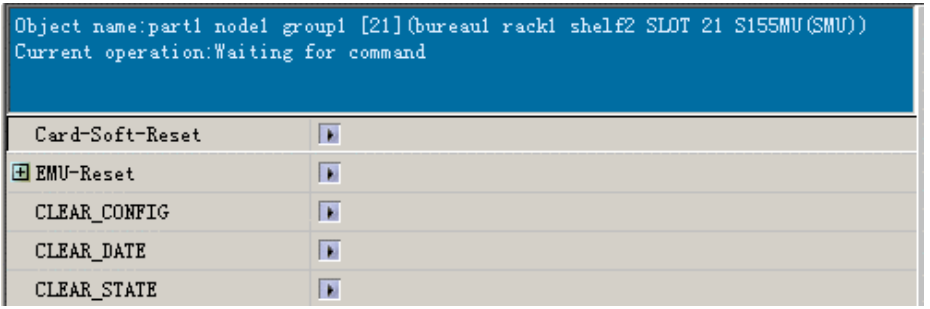
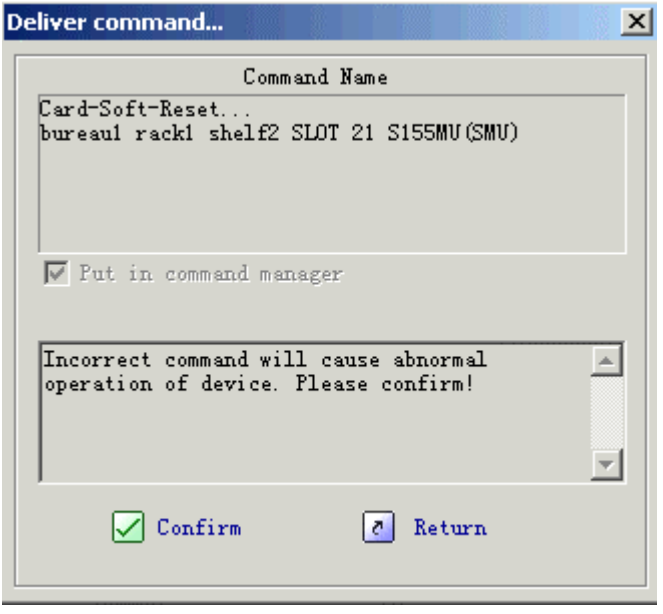


Figure 4-25 SMU card control command window

Select the items to give command in control command box, and click ▸ in right side of items with left key of the mouse to eject deliver command windows. Users only needs to click “confirm”. An example is given for card software restoration as shown in the following figure.



4.2 155Mbit/s Optical Interface Card（O155）

It is abbreviated as O155_2B in network management system.

4.2.1 Card Configuration

Basic configuration

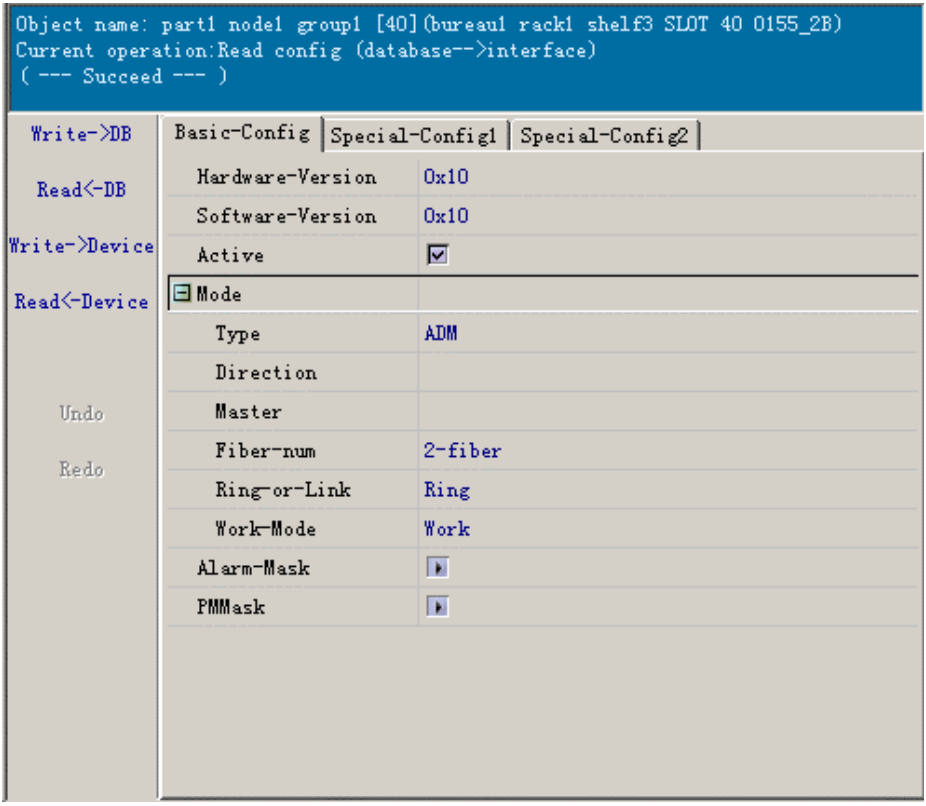
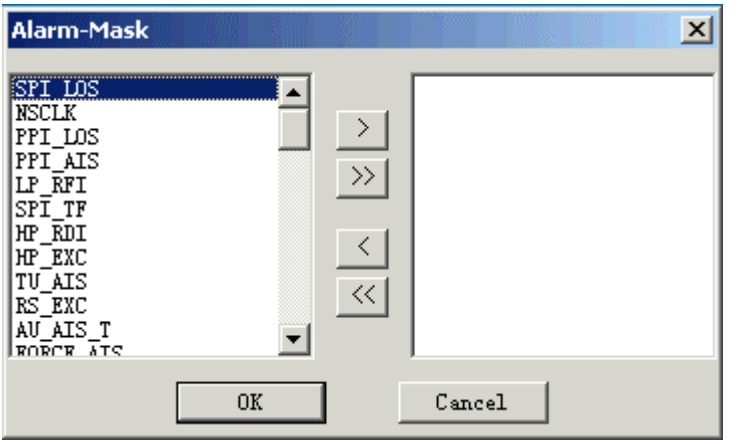


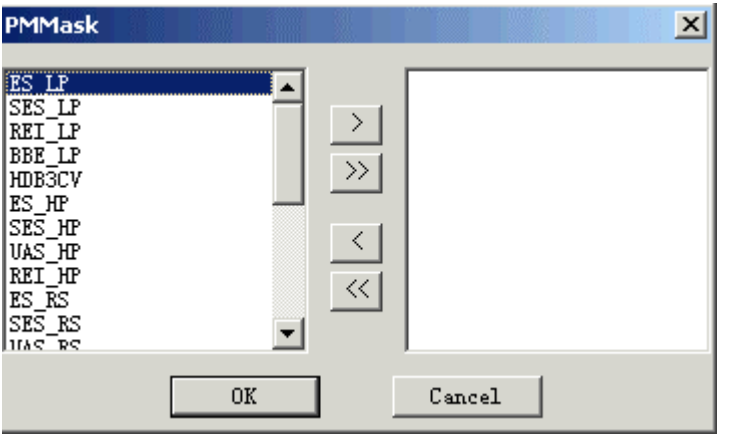
Figure 4-26 O155 card basic configuration window

Mode：Equipment type includes ADM, TM, REG. It is usually configured as ADM,and can be configured as TM when it acts as terminal.

Alarm -Mask and PMMask

Click spread button ▸ in right side of “Alarm -Mask”or”PMMask”, and corresponding dialog boxes will eject, as shown in the following figure.





Because multiple cards use one same network management

interface, some configurations are of no use. For them, users can select default mode directly.

Special- Config 1

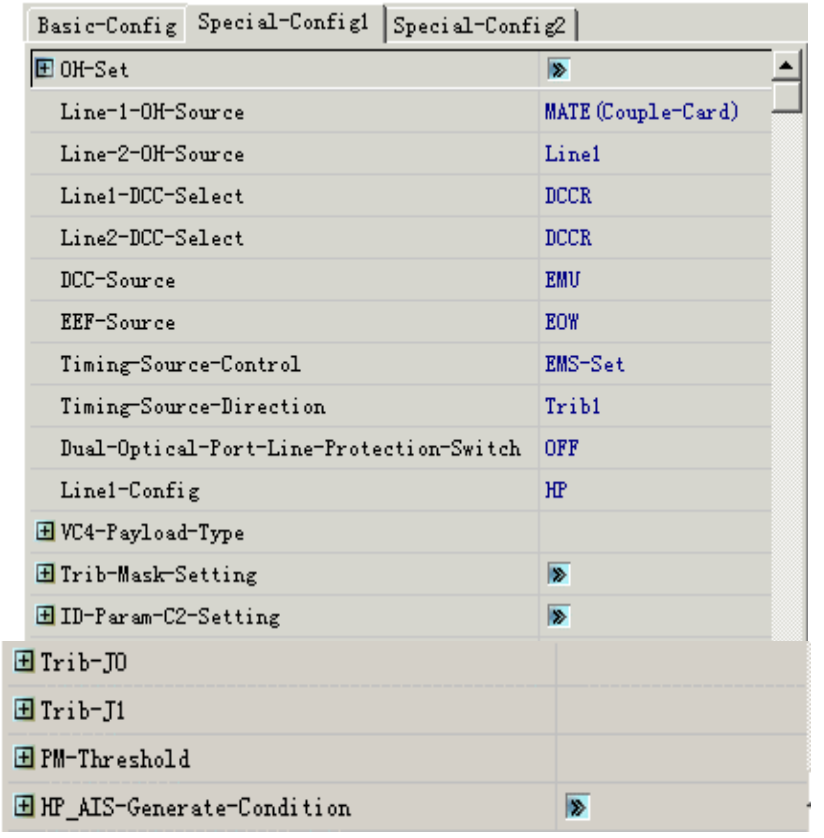


Figure 4-27 Special configuration 1 window of O155 card

OH Set: select default configuration

Line- 1-OH-Source ： Select default configuration.

Line- 2-OH-Source： Select default configuration.

Line 1-DCC-Select：Select default configuration DCCR.

Line 2-DCC-Select：Select default configuration DCCR.

DCC- Source：Select default configuration EMU.

EEF -Source：Select default configuration EOW.

Timing- Source- Control：Select EMS-Set.

Dual-Optical- Port -Line -Protection –Switch: Select off (default configuration).

Timing- Source -Direction：Select tributary 1.

Line1 -Config：Commonly select LP (meaning low level path) .

Note：As for the following configurations, because this card only supports one optical interface, users only need to perform configuration for tributary 1, while for tributary 2, default configuration can be selected.

VC4 –Payload- Type：Users can select TU12 or TU3 in pulldown options of TUG1-3.

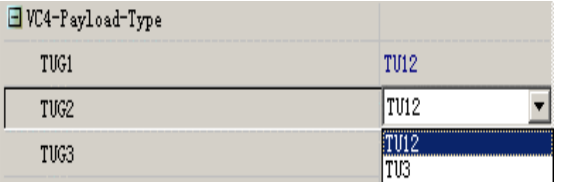


Figure 4-28 VC4 –Payload- Type configuration

Trib- Mask- Setting

Figure 4-29 Configuration mode 1 of Trib-Mask

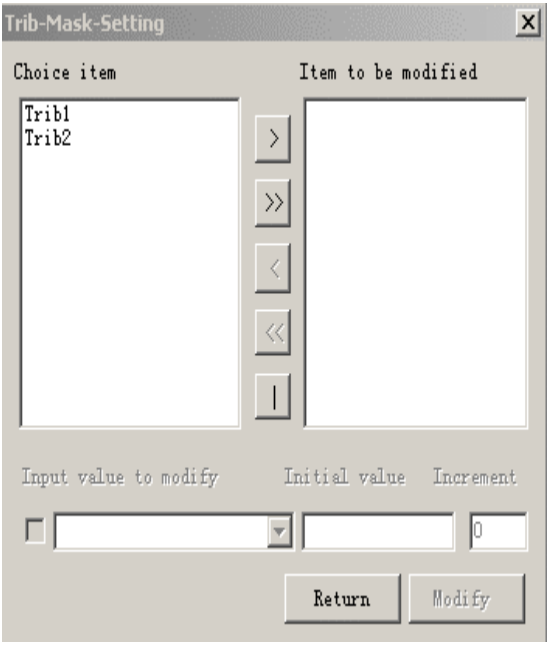


Figure 4-30 Configuration mode 2 of Trib- Mask

ID-Param -C2-Setting

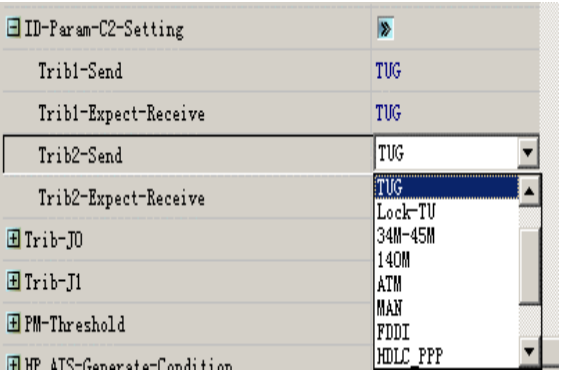


Figure 4-31 Configuration mode 1 of ID-Param -C2

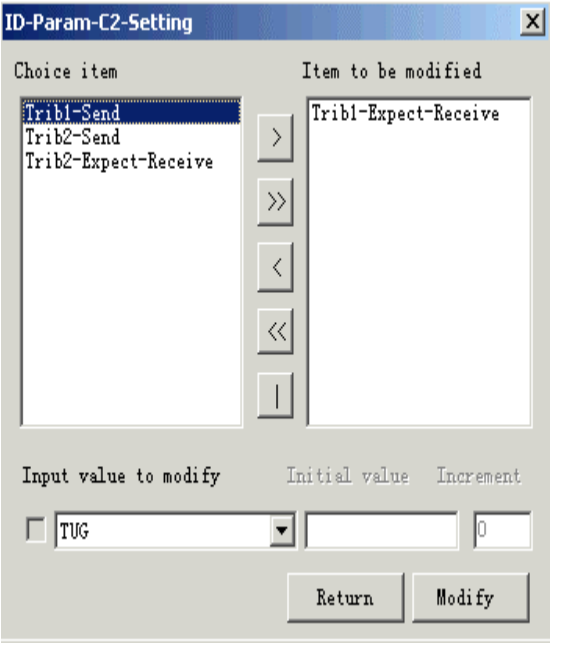


Figure 4-32 Configuration mode 2 of ID-Param -C2

Trib- J0：It is used to set J0 series transmitted and expected to be received by tributary.

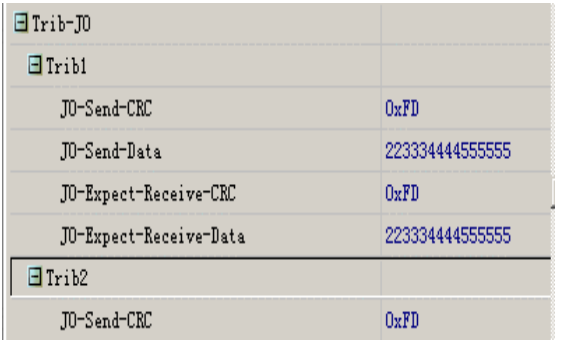


Figure 4-33 Trib- J0 setting

Trib- J1：It is used to set J1 series transmitted from and expected to be received by tributary.

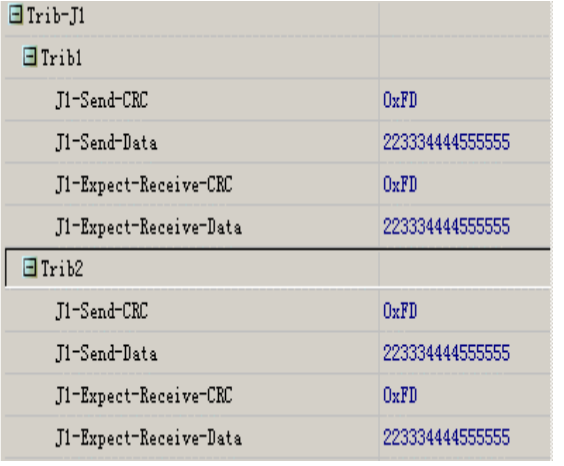


Figure 4-34 Trib- J1 setting

PM- Threshold：It is used to set thresholds of various alarms. When the threshold is exceeded, corresponding alarm information shall be generated.

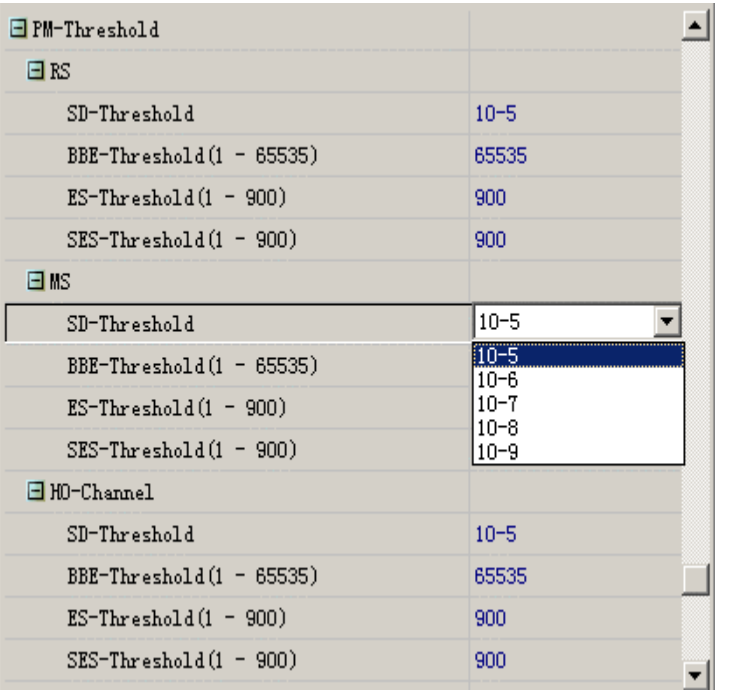


Figure 4-35 PM- Threshold configuration

HP-AIS –Generate- Condition ： It is used to set whether HP-AIS is transmitted downstream under MS_EXC or MS_SD conditions.

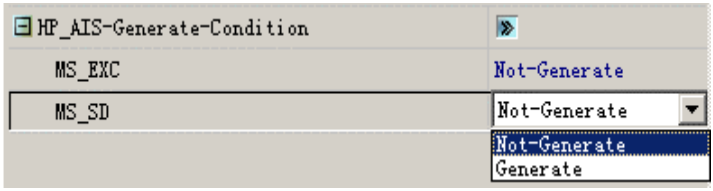


Figure 4-36 Configuration mode 1 of HP-AIS-Generate-Condition

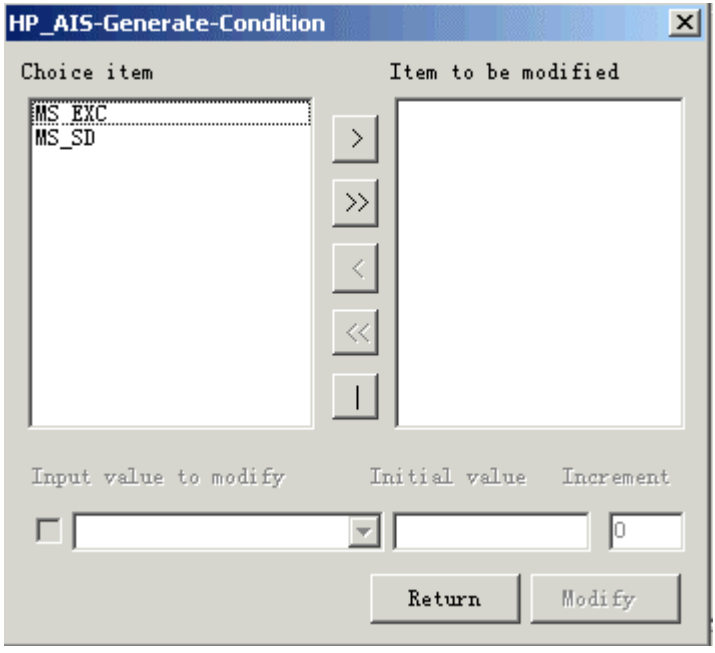


Figure 4-37 Configuration mode 2 of HP-AIS-Generate-Condition

Special- Config 2

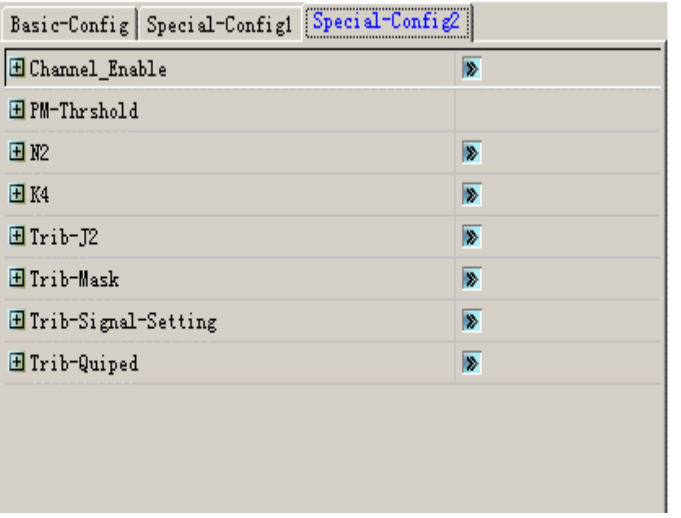


Figure 4-38 Special- Config 2 window of O155 card

Note：For configuration items inside Special- Config 2, users only need to choose default configuration and do not need any change.

4.2.2 Card Control Command

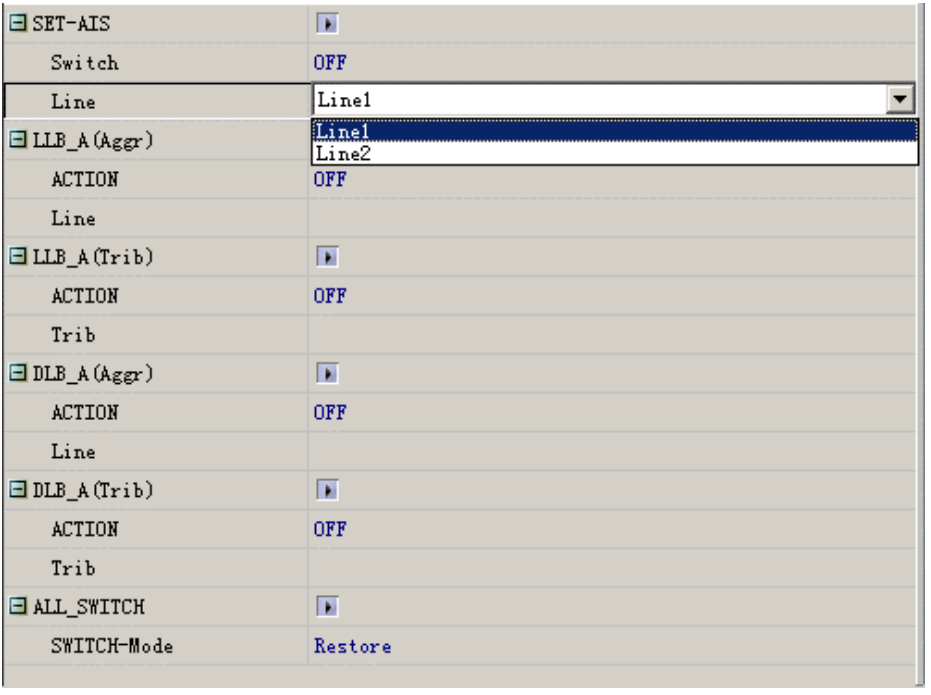
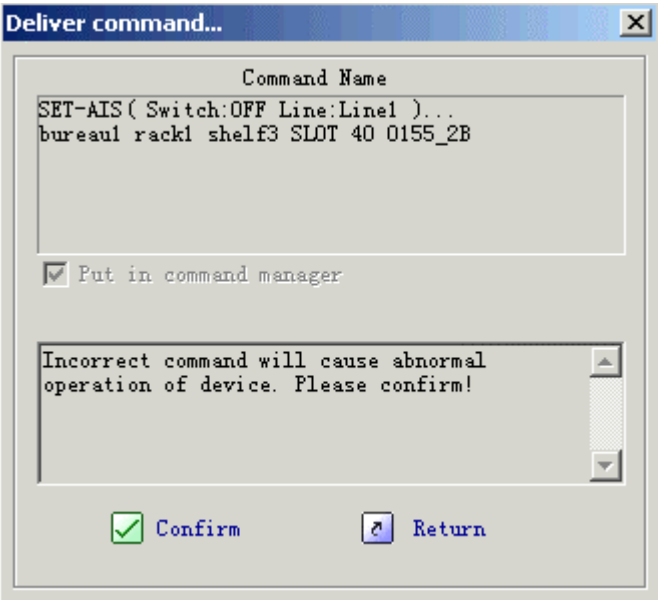


Figure 4-39 O155 card control command window

Click spread button ⊞ at left side of selective items inside control command with mouse left key and select corresponding lines inside pulldown menu. Then users only need to click ▶ at right side and click “confirm” after deliver command window is ejected. We take SET- AIS as an example and others are similar.



4.3 4-Channel Fast Ethernet Switch Transparent Transmission Card（ESD1）

It is configured as ESD1 in network management system.

4.3.1 Card Configuration

Basic configuration

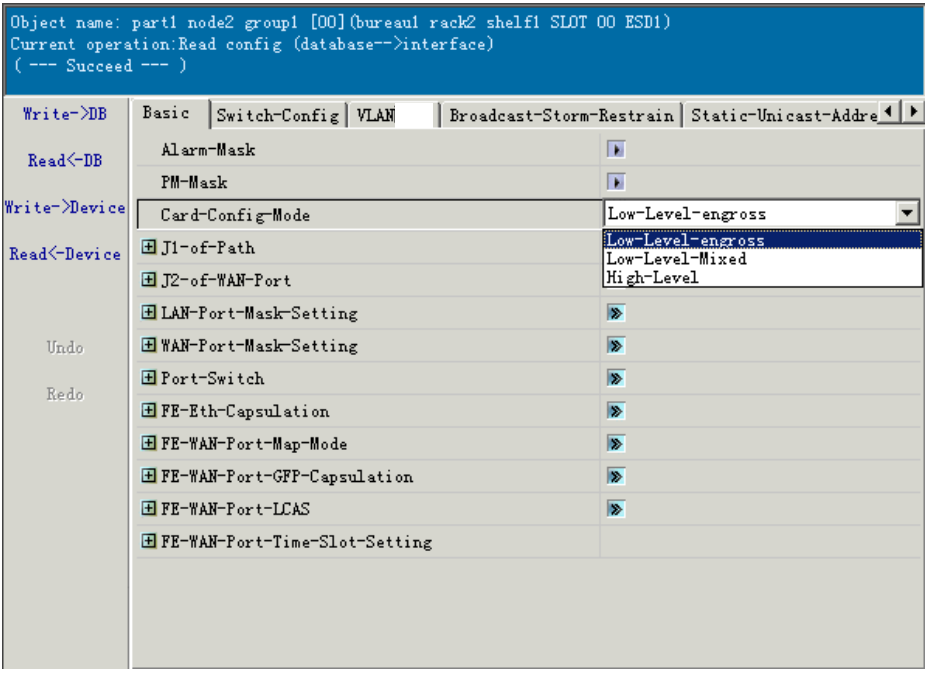
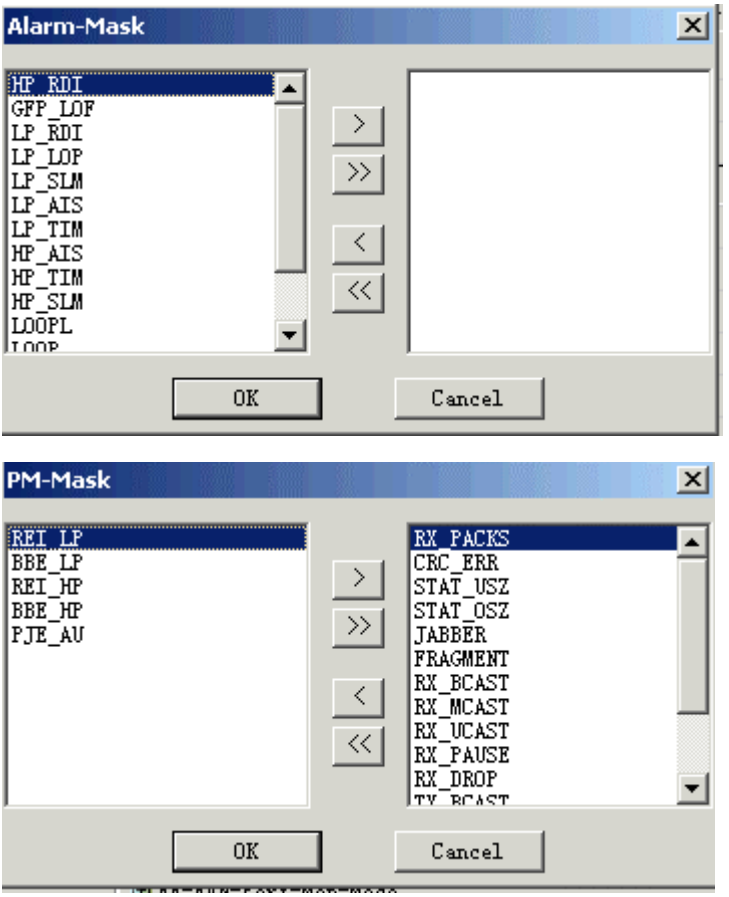


Figure 4-40 ESD1 card basic configuration window

Alarm -Mask and PM- Mask

Click spread button ▶ in right side of “Alarm -Mask” or “PM- Mask”. After “Alarm -Mask” or “PM- Mask” dialog box is ejected, as the following figure, users can operate as that of 155Mbit/s system card.



J1-of –Path

It is described as follows: when card adds/drops services through 4 high level VC4 paths, it is used to configure J1series of 4 VC4 paths. The setting has two types as shown in the following figure. Mode 1:as the figure indicates, click items to be modified inside pulldown menu at expanded item below J1-of –Path for configuration. Mode 2: click button in right side of J1-of –Path with mouse left button and make J1-of –Path dialog box as shown in figure “threshold setting 1”

eject. Then select items to be configured inside choice item at left box. Users can also click buttons at right side of J1-of –Path with mouse left key. When the dialog box appears as shown in the following figure threshold setting 1, users can select items for configuration in choice item inside left side box and click . After this operation, the selected items are added to item- to-be- modified inside right side box. Then users can fill in corresponding contents at position to Input value to modify and click modification button “Modify”. After the above operation, users can perform set operation for selected items. The default configuration can be used in this equipment.

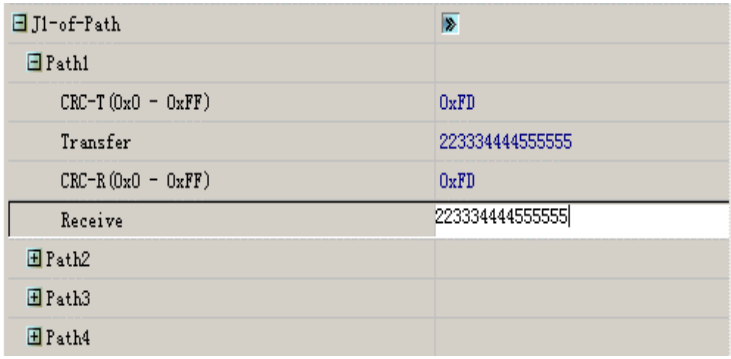


Figure 4-41 Configuration mode 1 of path J1

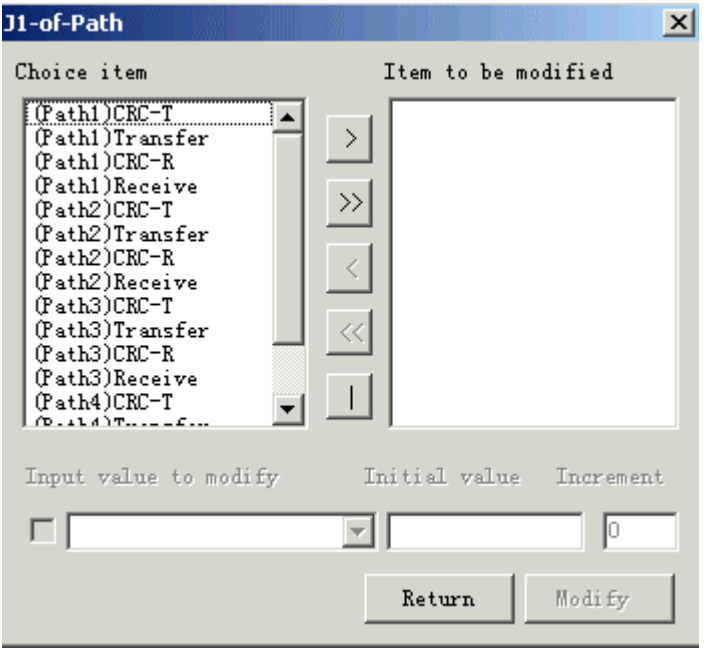


Figure 4-42 Configuration mode 2 of path J1

J2 –of -WAN -Port

The WAN port J2 has two types of configurations, whose operation mode is similar to that of path J1. It is used to configure J2 series transmitted and expected to be received by VCG occupied by 8 WAN ports.

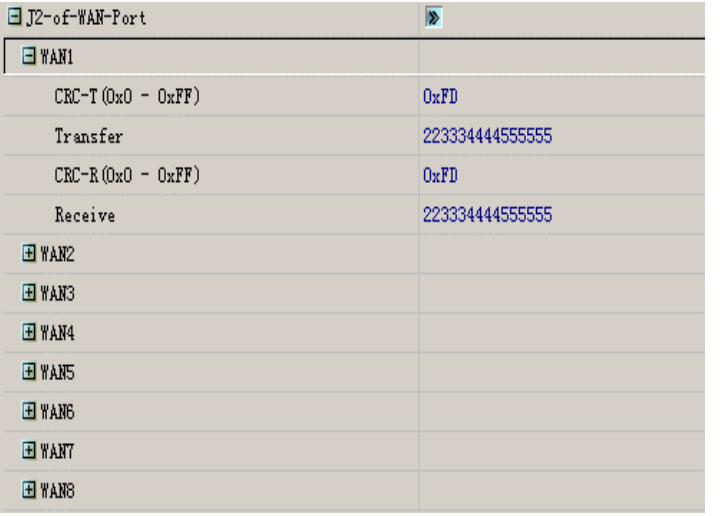


Figure 4-43 J2 –of -WAN -Port setting

LAN- Port –Mask- Setting

LAN port has two mask configuration modes, whose operation mode is similar to that of path J1 setting. It is used to set alarm and performance for LAN. But it does not affect normal working of port.

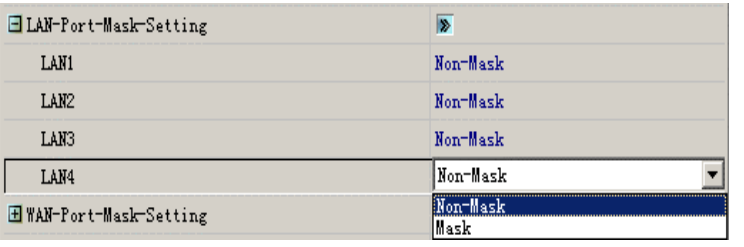


Figure 4-44 LAN- Port –Mask- Setting

WAN –Port- Mask- Setting

WAN port has two mask configuration modes, whose operation mode

is similar to that of path J1 setting. It is used to set alarm and performance for WAN.

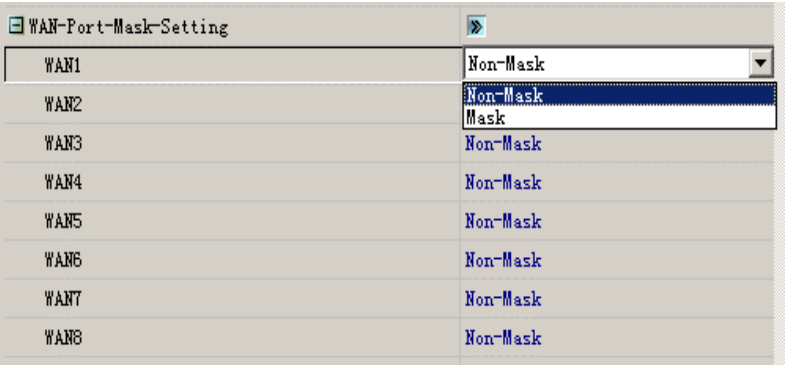


Figure 4-45 WAN –Port- Mask- Setting

Port -Switch

Port switch has two configuration modes, whose operation mode is similar to that of path J1 setting. It is used to set start-up or shut-off of ports.

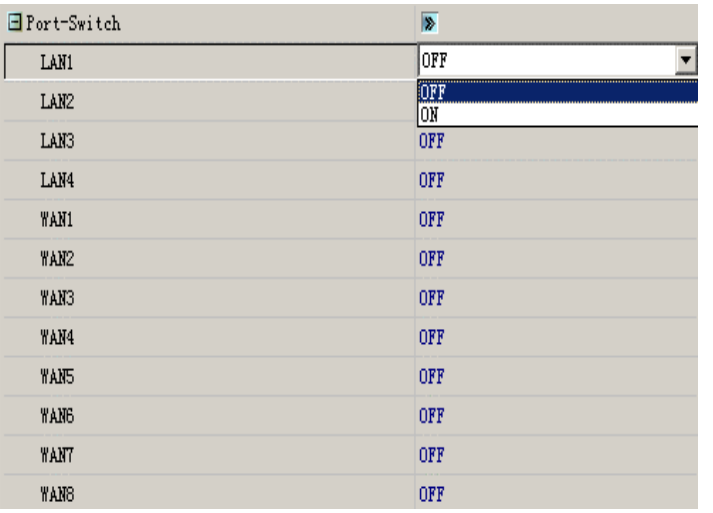


Figure 4-46 Port- Switch setting

FE- Eth -Capsulation

FE- Eth -Capsulation has two setting modes,whose operation mode is similar to that of path J1 setting. It is used to configure capsulation protocol types from FE to VCG at 8 WAN ports.

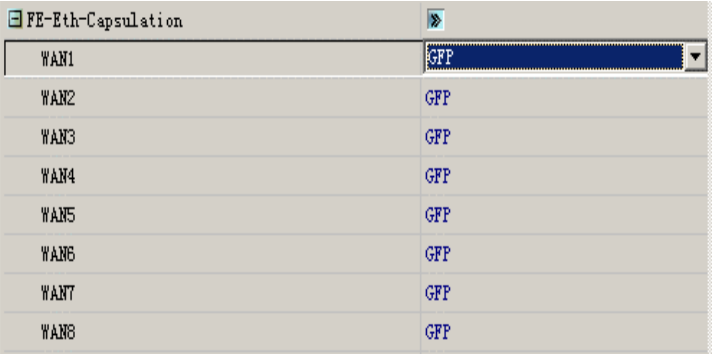


Figure 4-47 FE- Eth -Capsulation setting

FE-WAN-Port –Map -Mode

FE-WAN port has two map modes, whose operation mode is similar to that of path J1 setting. It is used to configure VC path types occupied by each one of 8 WAN ports.

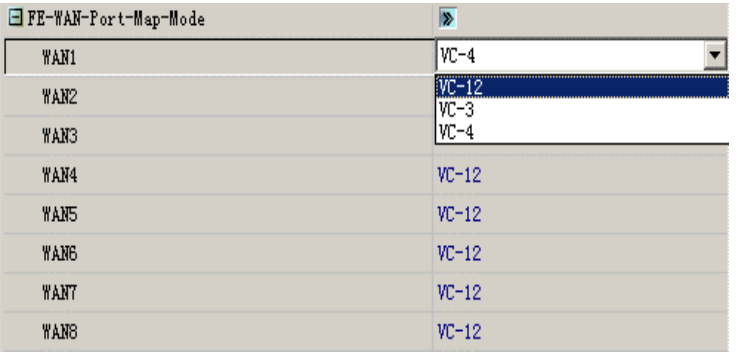


Figure 4-48 FE-WAN-Port –Map -Mode setting

FE-WAN-Port –GFP-Capsulation FCS setting

FE-WAN-Port–GFP-Capsulation FCS has two setting modes,whose operation mode is similar to that of path J1 setting. It is used to configure whether FCS check is used when WAN port capsulation adopts GFP mode.

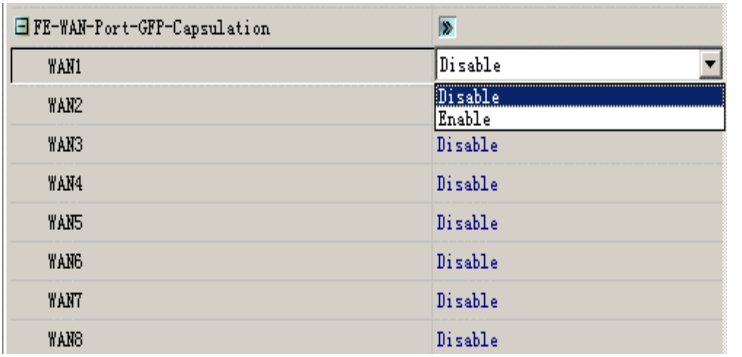


Figure 4-49 FE-WAN –Port -GFP -Capsulation FCS setting

FE-WAN-Port- LCAS setting

FE-WAN -Port -LCAS setting has two modes,whose operation mode is similar to that of path J1 setting. It is used to configure LCAS mode for virtual concatenation of 8 WAN ports.

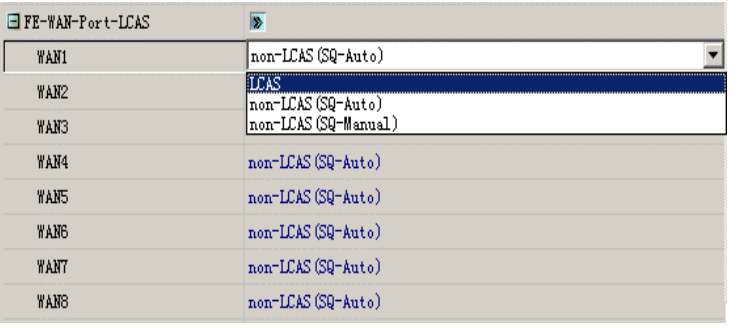


Figure 4-50 FE-WAN-Port- LCAS setting

FE-WAN-Port- Time- Slot- Setting

FE-WAN-Port- Time- Slot- Setting has two modes,whose operation mode is similar to that of path J1 setting. It is used to configure VC time slot included by VCG occupied by 8 WAN ports. When service is

accessed into high level path, paths 1-4 can be occupied. When service is accessed into low level path, only path 1 is occupied. Note: IBAS110A system only uses low level path, so only path 1 is occupied.

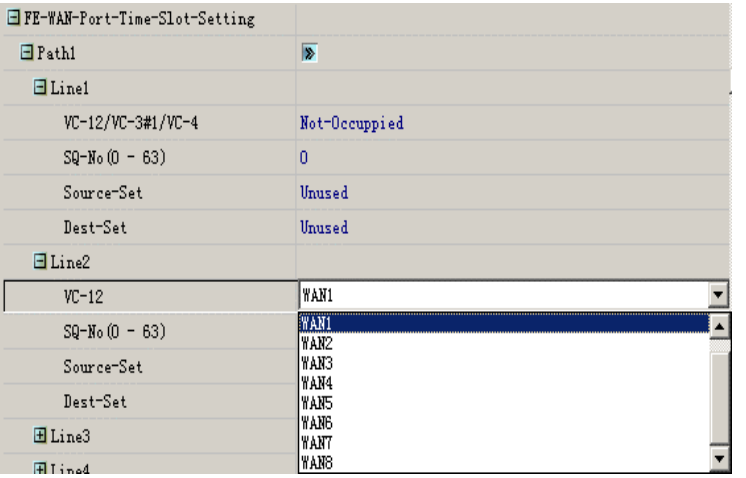


Figure 4-51 FE-WAN-Port- Time- Slot- Setting

In this figure, only 2 lines of path 1 are spread. The spread items of other paths are similar.

Switch- Config

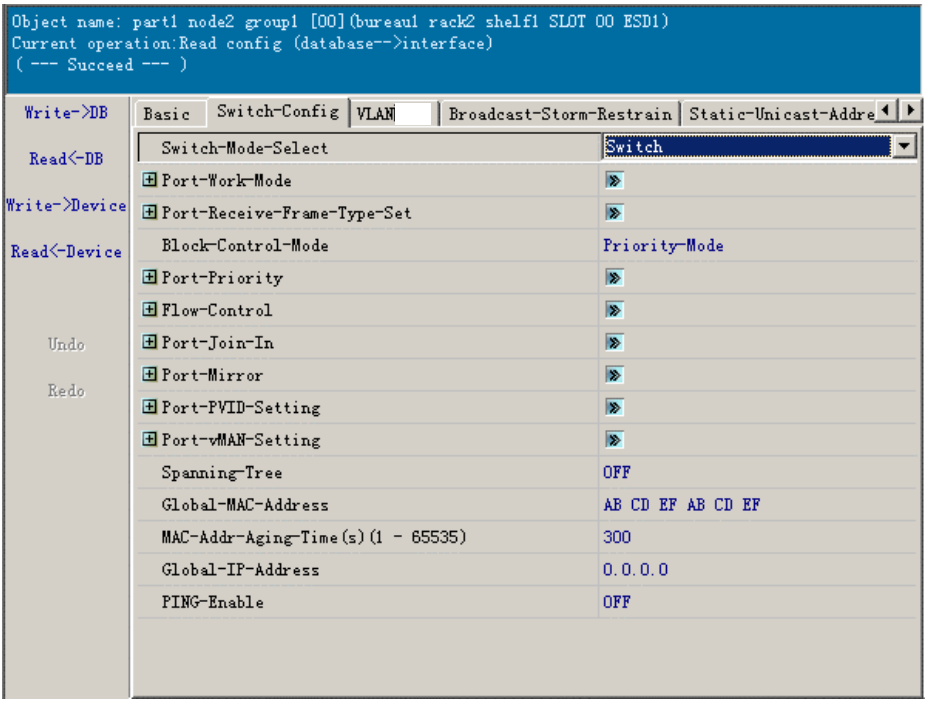


Figure 4-52 ESD1 card switch configuration window

Switch- mode- select：It is used to configure working mode of packet switch function inside card. When switch adopts “transparent transmission” mode, switch is set as port transparent transmission working mode, with electrical interface card being LAN1/LAN2/LAN3/LAN4 respectively transparently transmitted to WAN1/WAN2/WAN3/WAN4, optical interface card being LAN1/LAN2/LAN3/LAN4 respectively transparently transmitted to WAN5/WAN6/WAN7/WAN8;When switch adopts “switch” mode, port transparent transmission working mode is cancelled and it performs normal transfer.

Port –Work- Mode

Port –Work- Mode includes two setting types,whose operation mode is similar to that of path J1 setting. It is used to set LAN port physical layer working mode.

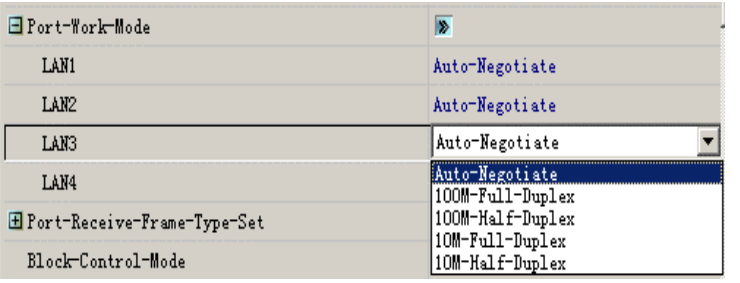


Figure 4-53 Port –Work- Mode setting

Port-Receive-Frame-Type-Set

Port-Receive-Frame-Type has two set types, whose operation mode is similar to that of path J1 setting. It is used to configure work mode in MAC layer of WAN and LAN ports.

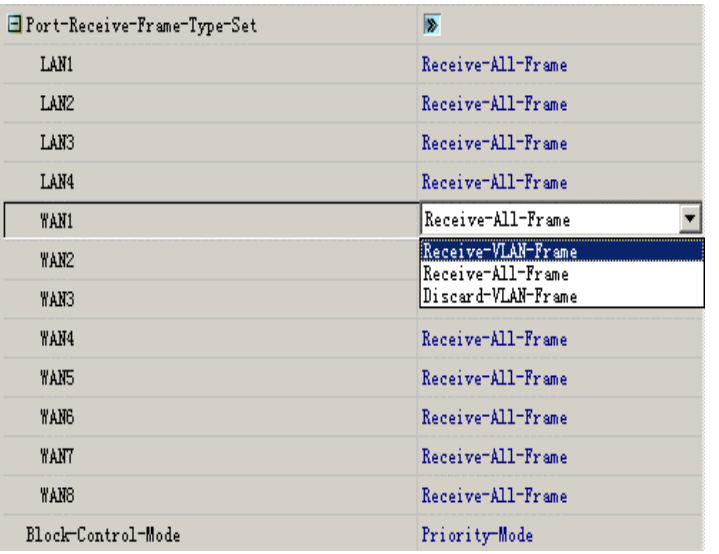


Figure 4-54 Port-Receive-Frame-Type setting

Port –PVID- Setting

Port PVID has two setting modes, whose operation mode is similar to that of path J1 setting. It is used to set VLAN ID based on port of WAN and LAN ports.

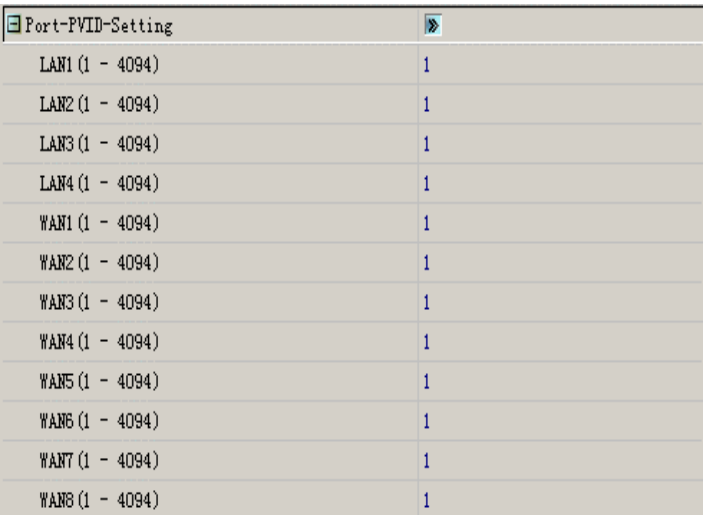


Figure 4-55 Port- PVID- Setting

Port- vMAN- Setting

Port vMAN has two setting types, whose operation mode is similar to that of channel J1 setting. It is used to determine whether or not to give double symbols to packets with VLAN symbols when they enter switch port to complete stack functions of VLAN.

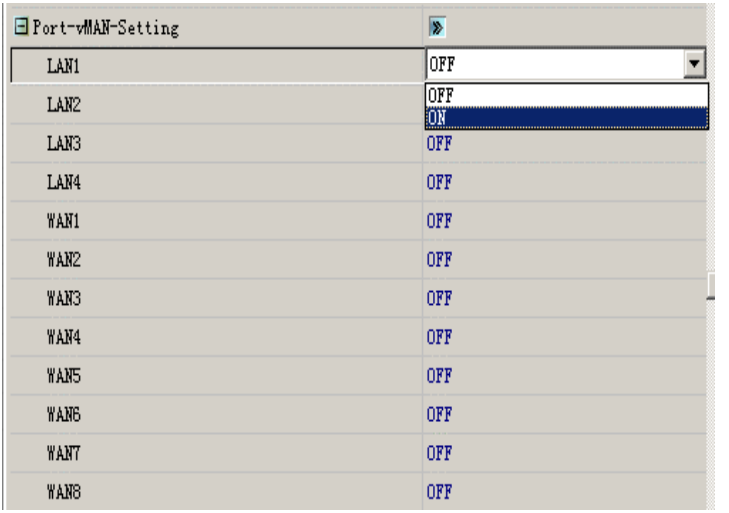


Figure 4-56 Port- vMAN -Setting

Spanning-Tree：It is used to configure start-up of spanning tree function of switch inside card.

Global- MAC- Address ：It is used to configure MAC address of switch inside card.

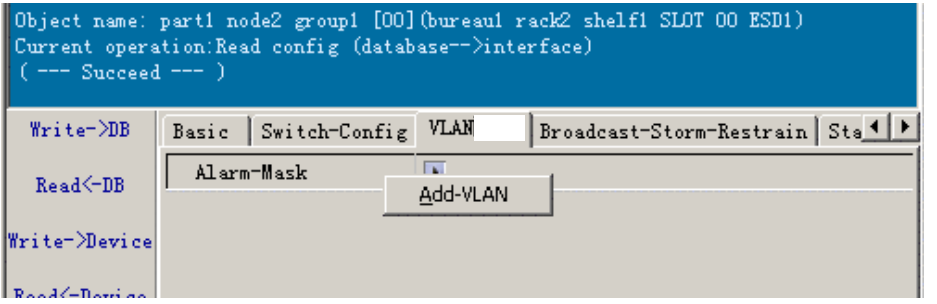
MAC- Addr- Aging- Time：It is used to configure MAC address aging time of switch inside card. It can adopt default values.

Global- IP -Address ：It is used to configure IP address of switch inside card.

PING- Enable：It is for test.

VLAN configuration

Click VLAN configuration GUI with mouse left key, and then click in empty item box with mouse right key. Then item bar shown as the following figure will eject. After it is selected, VLAN configuration GUI will appear (multiple VLANs can be configured). This is shown as the following figure.



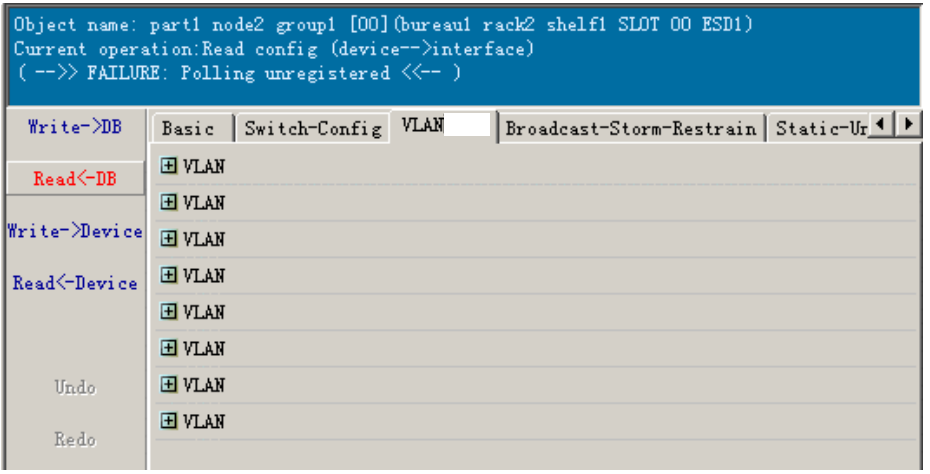
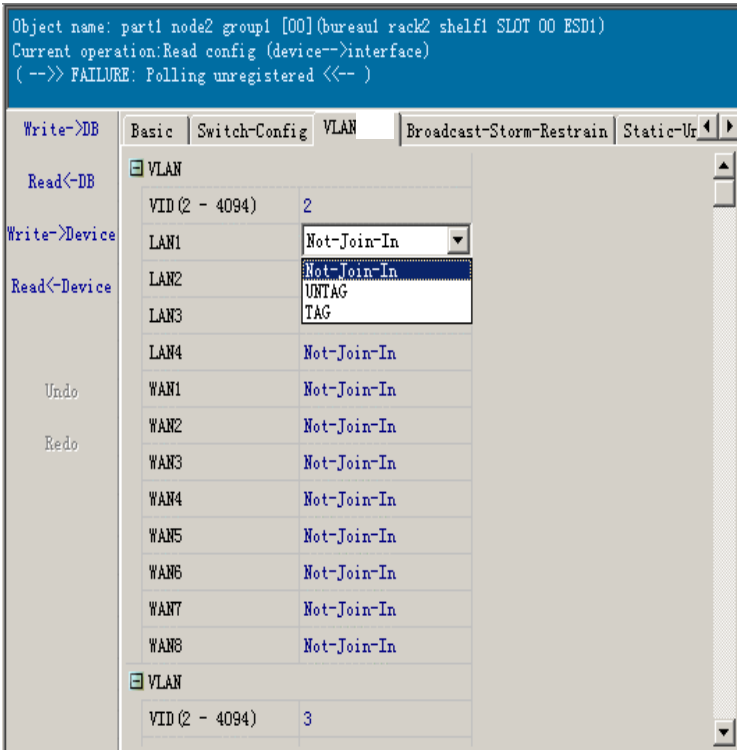
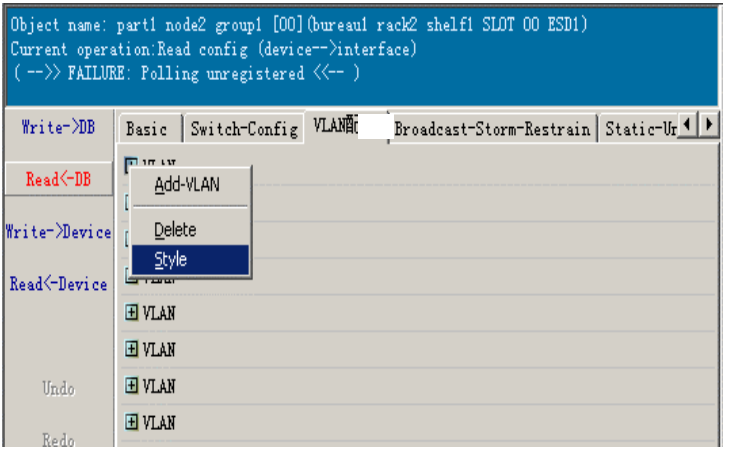


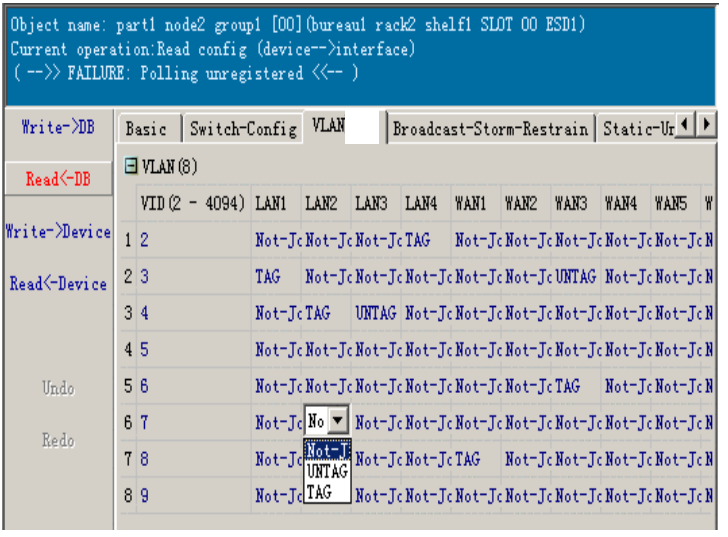
Figure 4-57 VLAN configuration window of ESD1 card

For every VLAN, it has the following spread configuration items.



The other VLAN configuration method is shown as the following figure. After the VLAN item bar is clicked with mouse right button, one item box will appear. Then users can select “Style” to make all VLAN configuration items appear.





Here, system performs configuration according to project conditions to determine whether each LAN or WAN interface belongs to one certain VLAN. If one LAN or WAN interface belongs to that VLAN, users also need to select whether to get rid of VLAN label （UNTAG） or remain it （TAG） when this VLAN packet is transferred from this

port.

Broadcast- Storm- Restrain

Its operation mode is similar to that of VLAN configuration, whose GUI is indicated as the following figure.

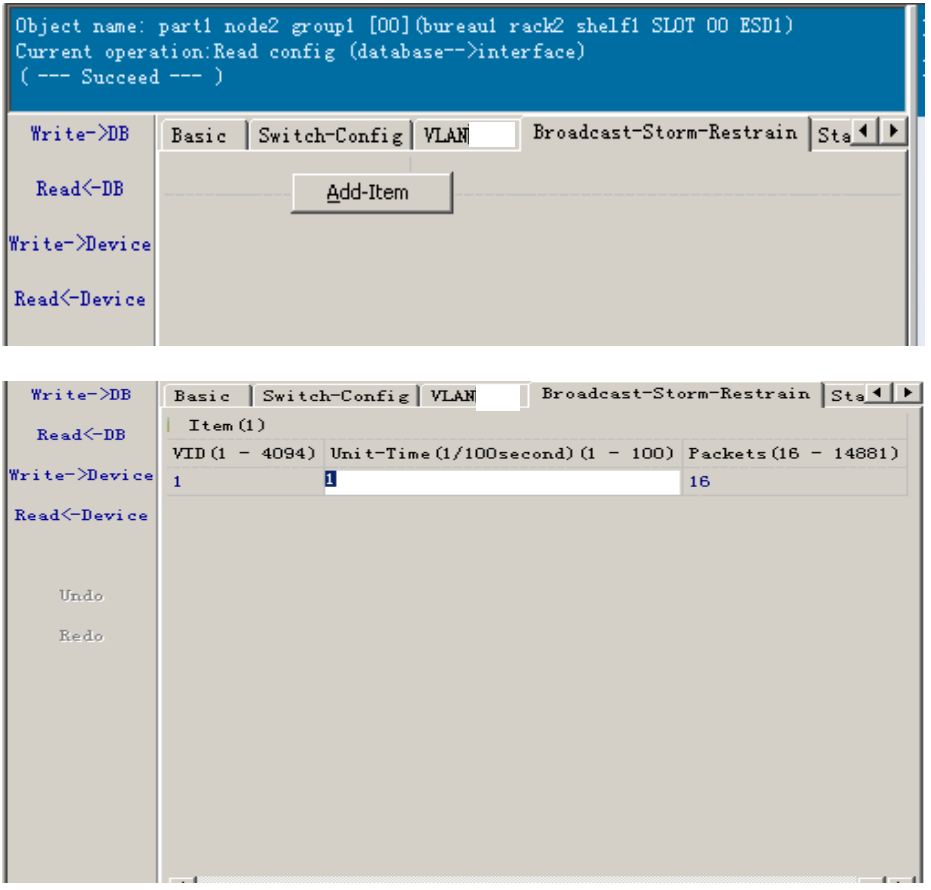


Figure 4-58 Broadcast- Storm- Restrain window of ESD1 card

This is used to configure broadcast packet traffic permitted by certain VLAN port to restrain broadcast storm. In this configuration, for each item, only the Unit-Time of 1st item is valid. If the Unit-Time is 1, it indicates 10ms. The Packets that are permitted to pass by Unit-Time are graded with 16 packets per one. For example, if Unit-Time is 1 and packets permitted to pass are 16, equipment permits 1600

packets to pass per second.

Static –Unicast – Address-Setting

Its operation mode is similar to that of VLAN configuration, whose configuration GUI is shown as the following figure.

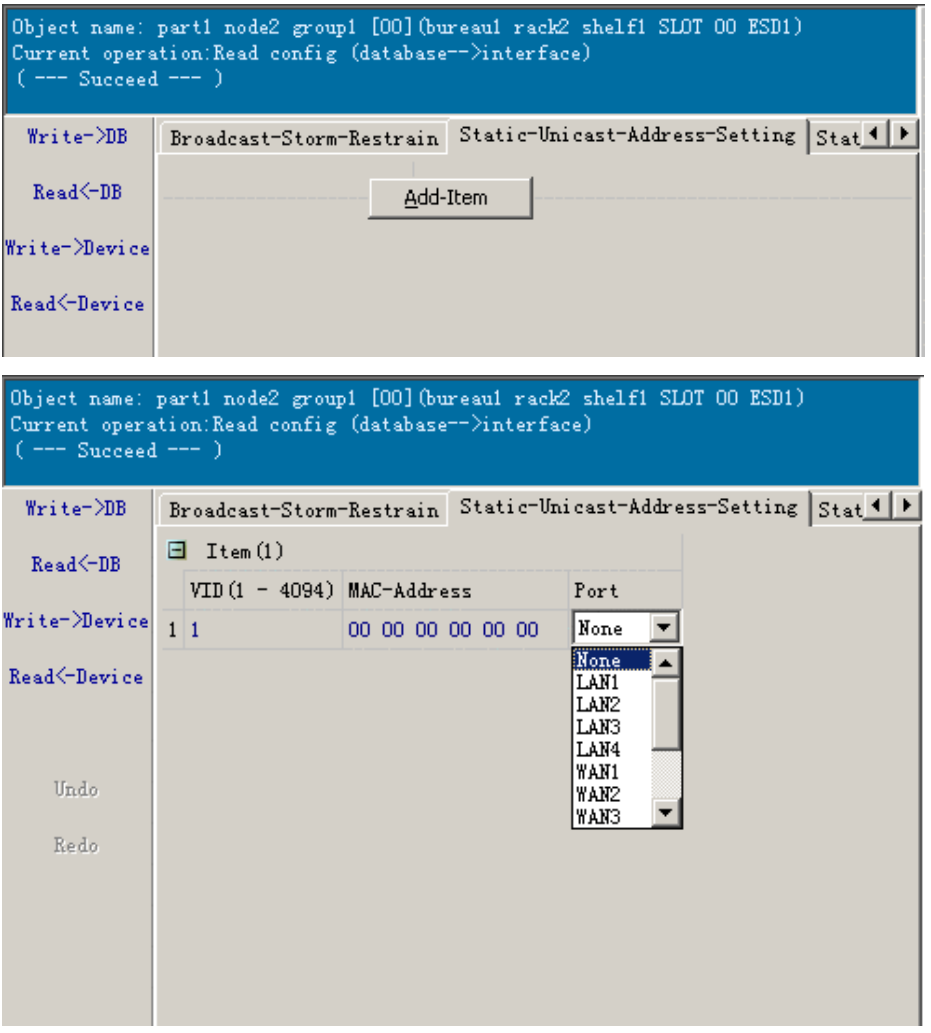


Figure 4-59 Static –Unicast – Address-Setting window of ESD1 card

It is used to configure the static address corresponding to one certain port inside one certain VLAN. This address is not to be aging, and the packets with this address as their destination address are only to be

transferred to corresponding ports.

Static Group-Cast-Address-Setting

Its operation mode is similar to that of VLAN configuration, whose configuration GUI is shown as the following figure.

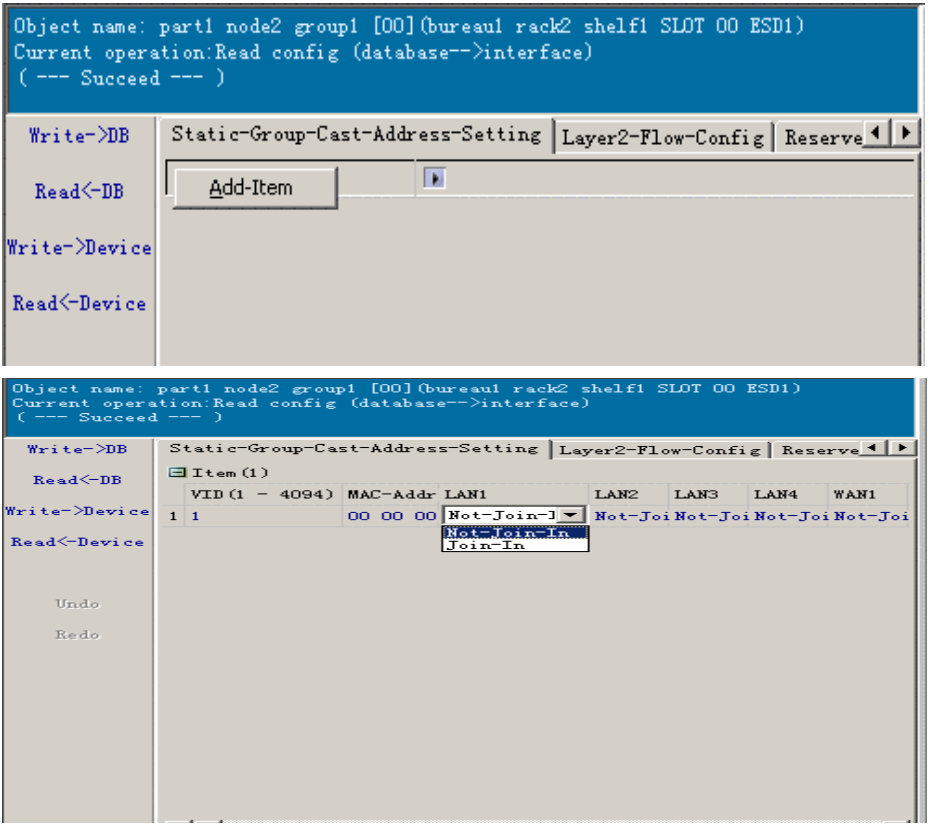


Figure 4-60 ESD1 card Static Group-Cast-Address-Setting window

It is used to configure the static addresses corresponding to certain ports inside one certain VLAN. This address is not to be aging, and the packets with this address as their destination address are only to be transferred to multicast group composed of corresponding ports.

Layer2 –Flow -Config

Its operation mode is similar to that of VLAN configuration, whose configuration GUI is shown as the following figure.

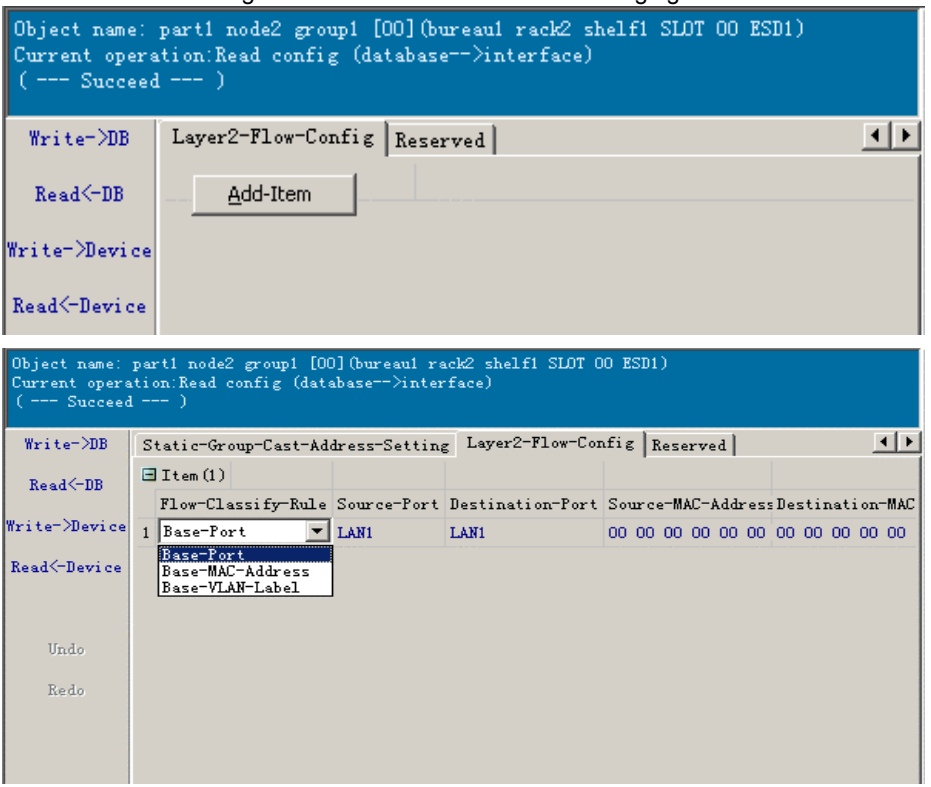


Figure 4-61 Layer2 –Flow -Config window of ESD1 card

It is used to configure bandwidth guarantee for one certain data

based on one certain strategy (port, MAC address, VLAN label). When bandwidth guarantee is based on port or MAC address, each item processes one single-direction data from source port (MAC address) to object port (MAC address). When bandwidth guarantee is based on VLAN label,the source and object VLAN label must be the same as each other to indicate data traffic bandwidth inside this VLAN has obtained guarantee.

4.3.2 Control Command

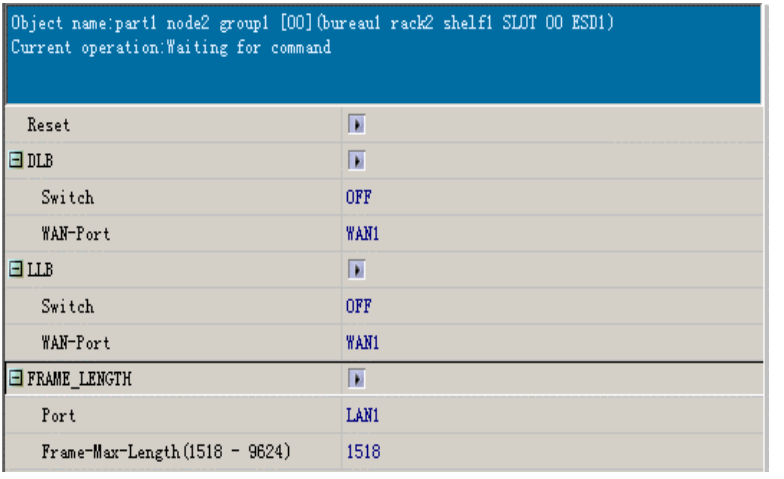
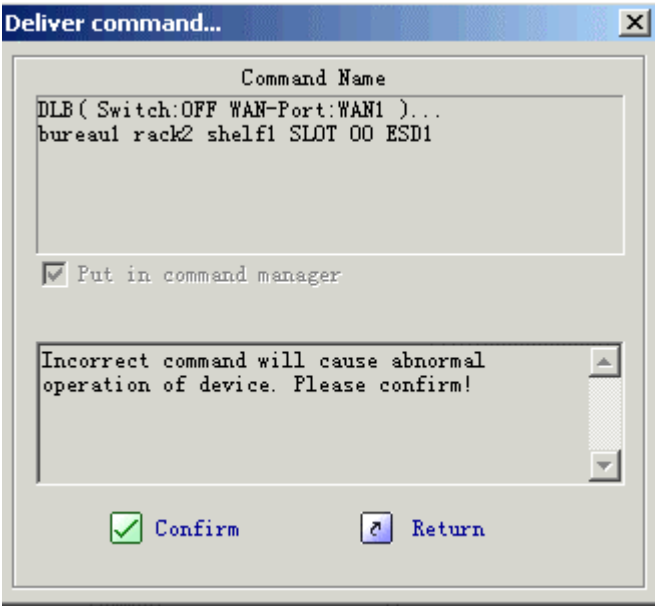


Figure 4-62 ESD1 card control command window

Choose the options to be given command in control command box,and then click ▶ at right side of item with mouse left key. After Deliver command window ejects, users only need to click “confirm”. We take DLB as an example as shown in the following figure.



4.4 4-Channel Ethernet Switch Card（ESW4）

4.4.1 Card Configuration

It is abbreviated as ESW_4 in network management system.

Basic- Config

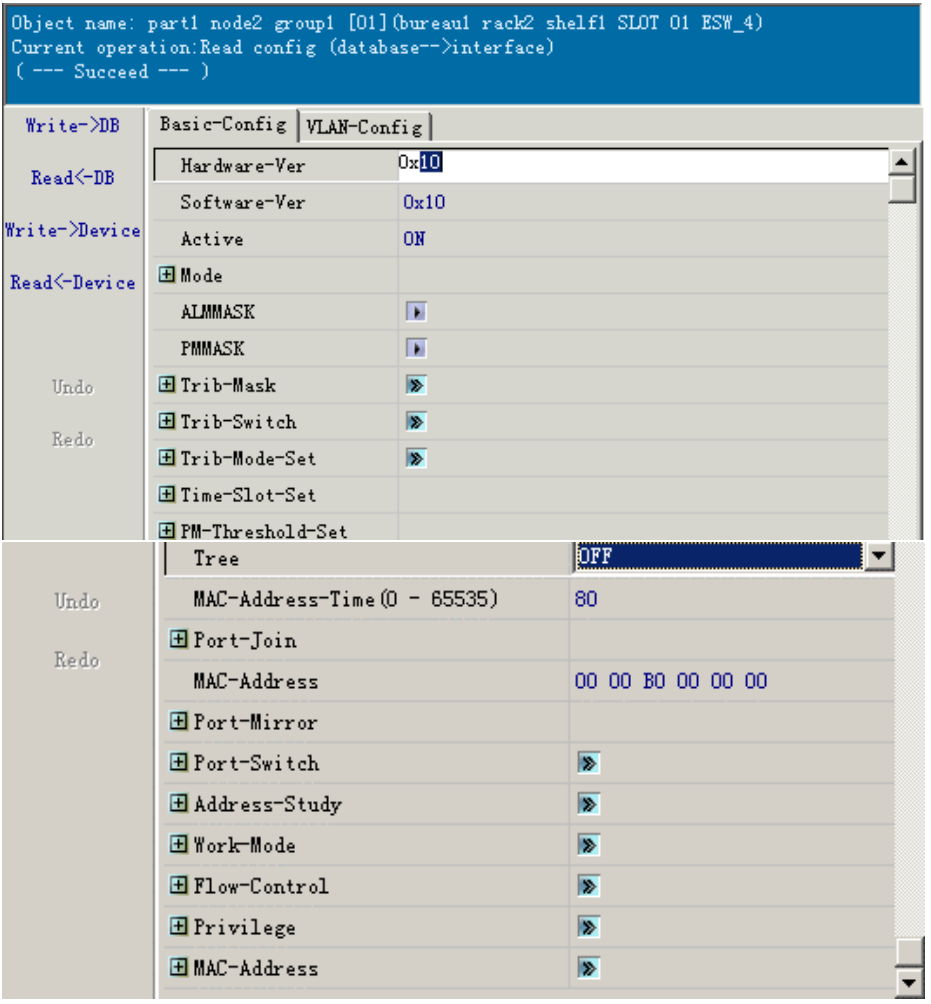
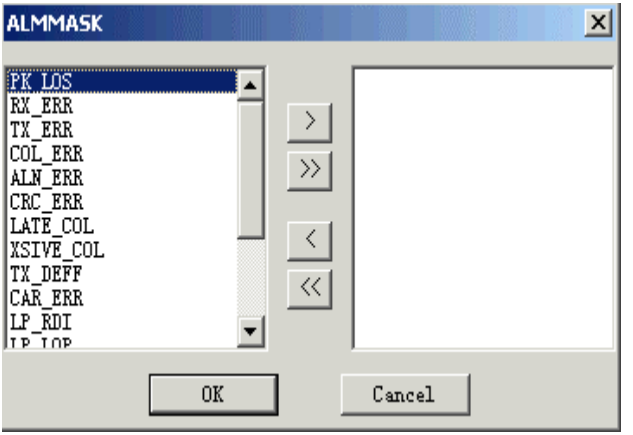


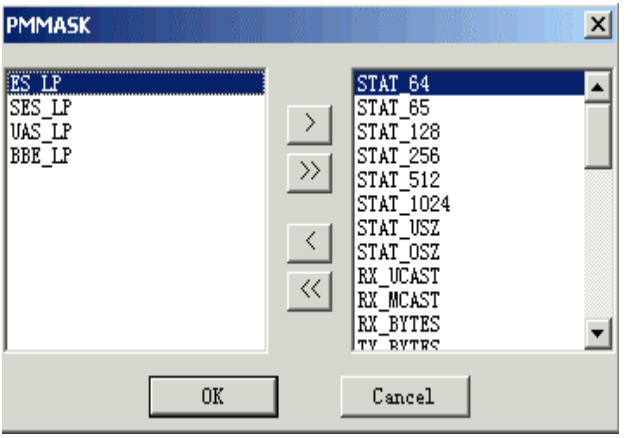
Figure 4-63 Basic- Config window of ESW4 card

Mode：Equipment types include ADM, TM, REG. It is usually selected as ADM,while it can be configured as TM when it is used as terminal.

ALARM MASK and PMMASK

Click spread button ▸ right side of “ALARM MASK”or “PMMASK”,and ALARM MASK or PMMASK dialog box shall eject as shown in the following figure. Its operation can refer to that of 155Mbit/s system card.





Trib-Mask

It is used to set whether or not to report alarm of performance of tributary. It includes two setting modes as shown in the figure: configuration mode 1：click the items to be modified in below menu of various items at each item below “Trib-Mask” and users can perform modifications. configuration mode 2：click button in right side of “Trib-Mask” with mouse left key, then the dialog box will eject as shown in the figure. At this time, users can choose items for setting in selective items inside left box. Then click add to add them into items be modified in right boxes. Then input values to modify and click modification button “Modify”. After this, users can perform setting operation for selected items.

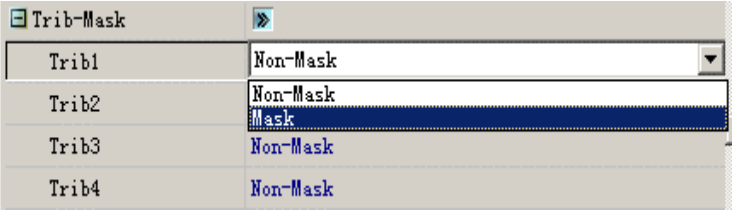


Figure 4-64 Configuration mode 1 of Trib-Mask

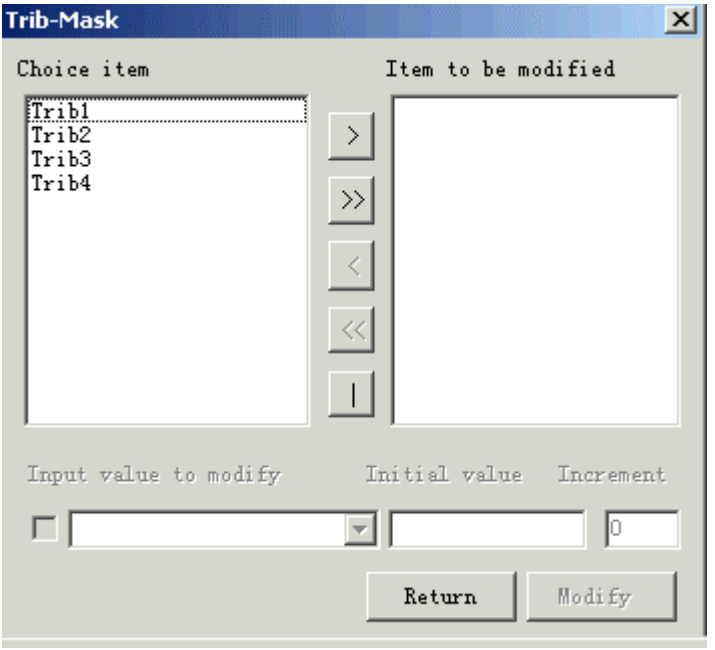


Figure 4-65 Configuration mode 2 of Trib-Mask

Trib- Switch

It is used to set start-up or shut-off of tributary ports. It has two setting modes, whose operation mode is similar to that of Trib-Mask setting.

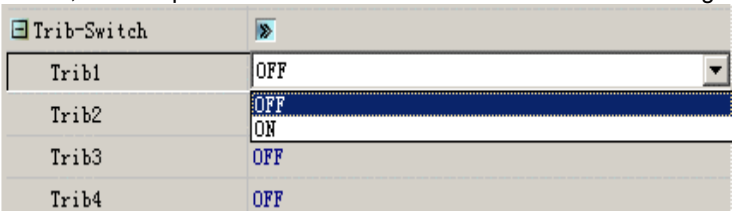


Figure 4-66 Trib- Switch setting

Trib- Mode- Set

It has two modes, whose operation mode is similar to that of Trib-Mask setting. It is used to set work mode of Ethernet tributary physical port.

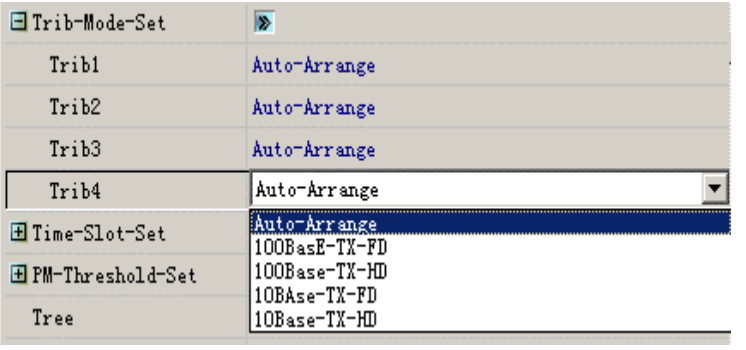


Figure 4-67 Trib- Mode- Set

Time -Slot -Set of tributary

It has two setting modes, whose work mode is similar to that of Trib-Mask. It is used to set VC paths occupied by each Ethernet tributary.

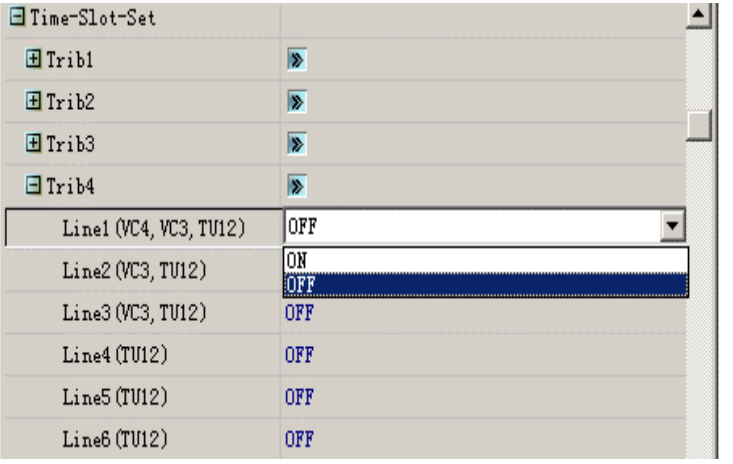


Figure 4-68 Time -Slot –Set of tributary

PM-Threshold- Set

It is used to set thresholds of various performances. When the performances exceed thresholds, corresponding alarm information shall be given.

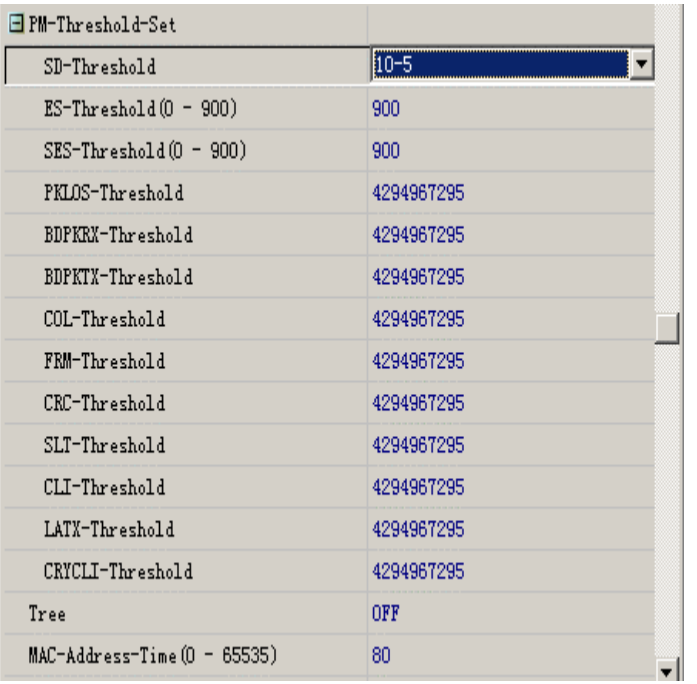


Figure 4-69 PM-Threshold- Set

Port setting

Port setting includes Port- Join setting, Port- Mirror setting and Port-Switch setting. Each one of them has two setting modes, whose work mode is similar to that of Trib- Mask setting. Port- Join is used to set status and members of join port group. Port- Mirror is used to set port and status of mirror. Port -Switch controls switch-on of 4 ports at network side.

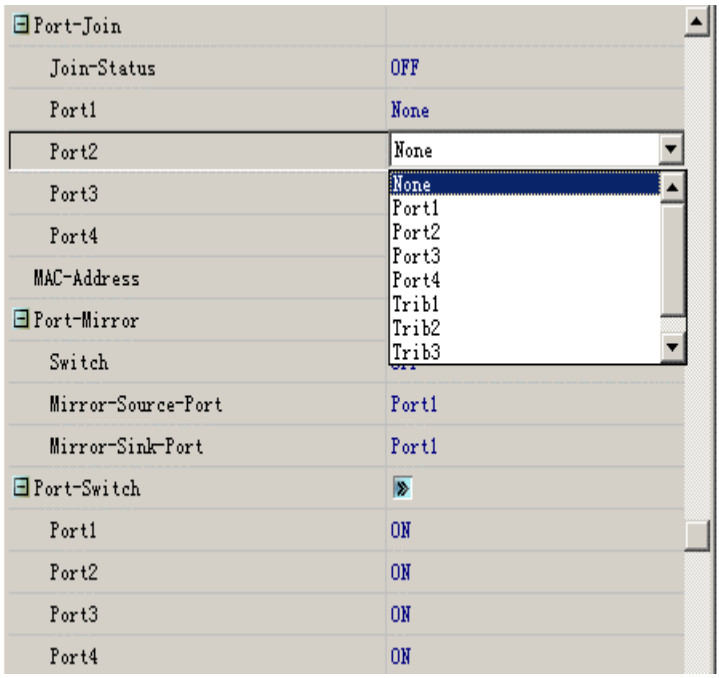


Figure 4-70 Port setting

Address-Study

It has two setting modes, whose work mode is similar to that of Trib-Mask setting.

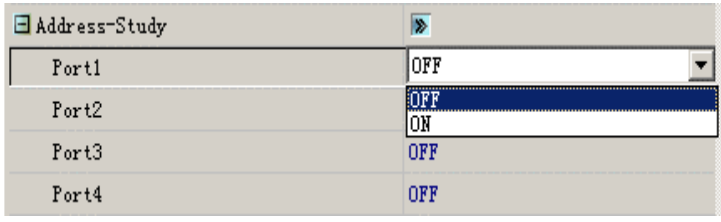


Figure 4-71 Address-Study setting

Work- Mode

It has two setting modes, whose operation mode is similar to that of Trib- Mask setting.

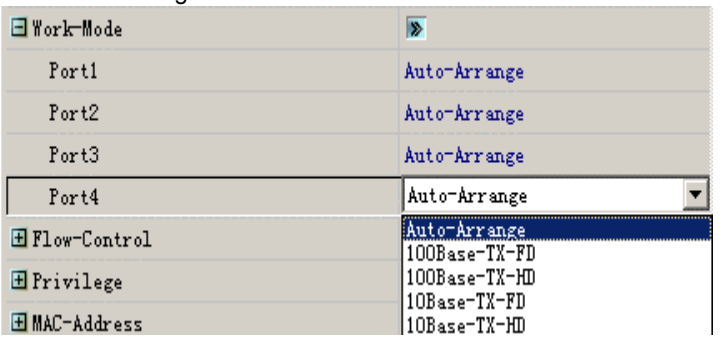


Figure 4-72 Work- Mode setting

Flow- Control

It has two setting modes, whose work mode is similar to that of Trib- Mask setting.

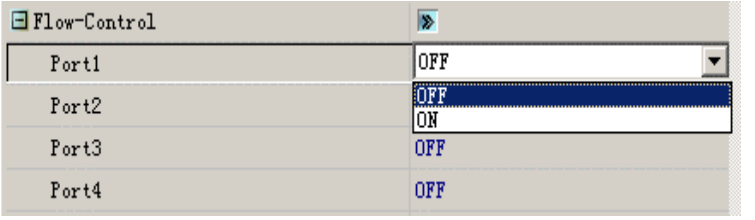


Figure 4-73 Flow- Control setting

Privilege setting

It has two setting modes, whose working mode is similar to that of Trib- Mask setting.

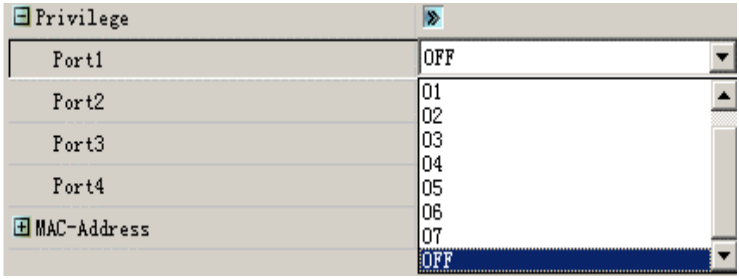


Figure 4-74 Privilege setting

Static MAC- Address configuration

It has two setting modes, whose working mode is similar to that of tributary mask setting.

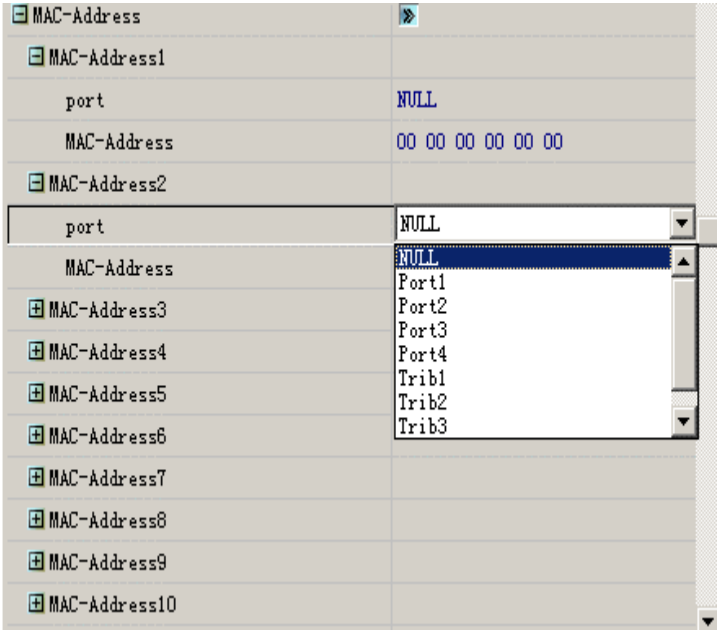


Figure 4-75 Static MAC- Address configuration

VLAN- Config

It is used to configure whether each LAN port or WAN port belongs to one certain VLAN. If each LAN or WAN port belongs to one certain VLAN, users still need to select to remove (UNTAG) or remain （TAG）VLAN label when this VLAN packet is transferred from this port.

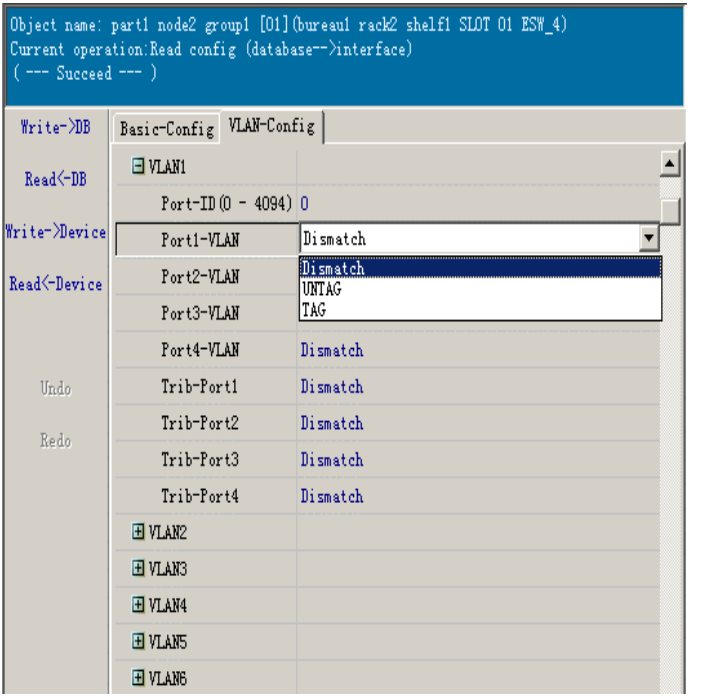


Figure 4-76 VLAN- Config window of ESW4 card

4.4.2 Control Command

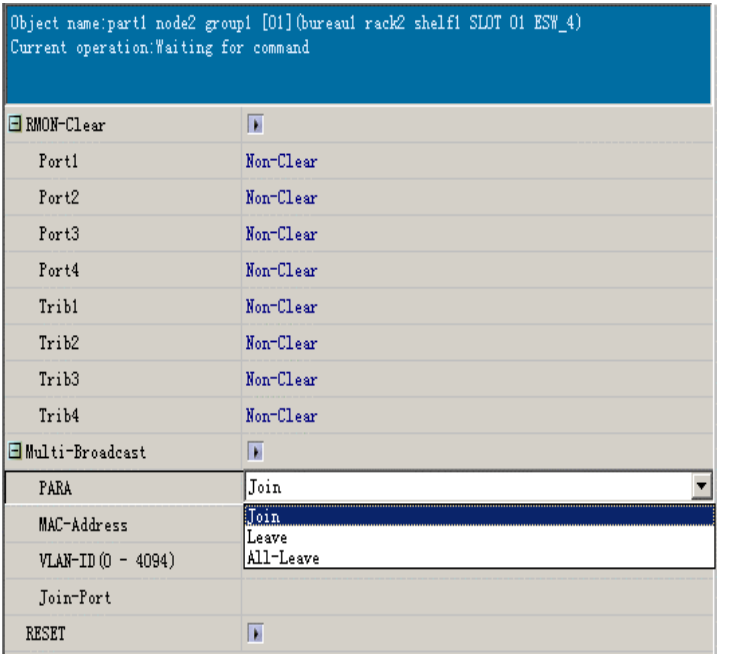
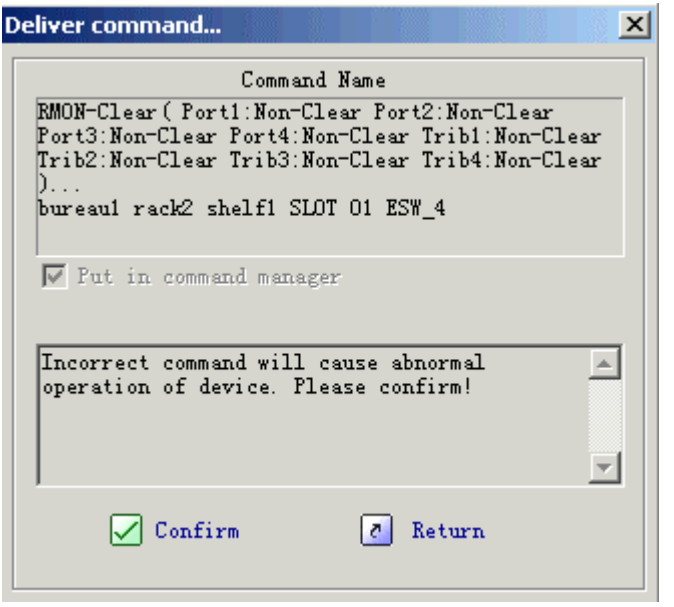


Figure 4-77 Control command window of ESW4 card

Select items to be given command in control command box,and click ▶ at right side of selective item with mouse left key. After command window ejects, users can click “confirm”. We take RMON-Clear as an example, as shown in the following figure.



4.5 4-Channel Ethernet Transparent Transmission Card（ETH4）

It is abbreviated as ETH_4 in network management system.

4.5.1 Card Configuration

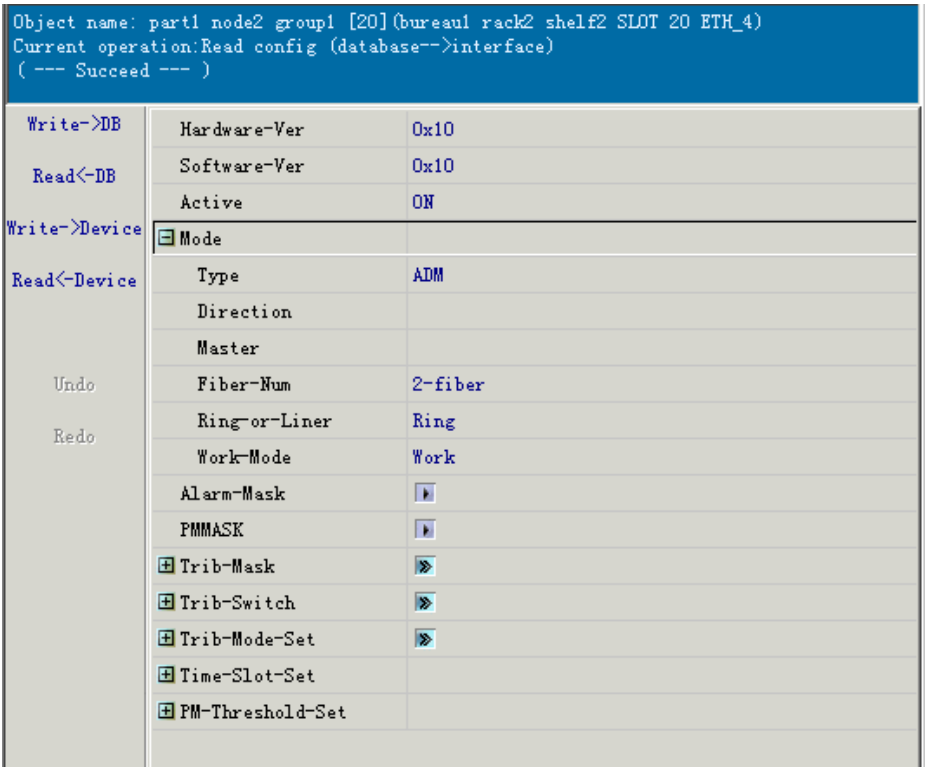


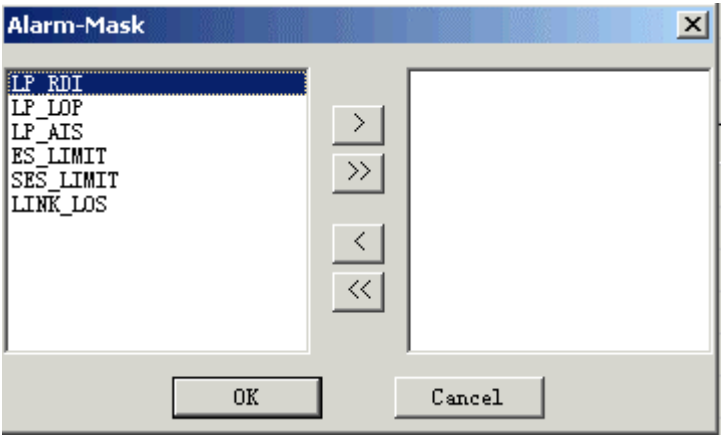
Figure 4-78 ETH4 card configuration window

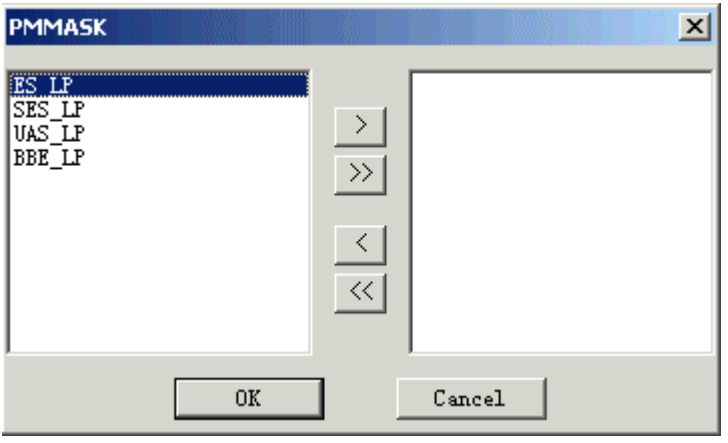
Mode：Equipment includes ADM, TM, REG. It is often configured as ADM, and can be configured as TM when it acts as terminal.

Alarm-Mask and PMMASK

Click spread button in right side of “Alarm-Mask”or”PMMASK” ,and “Alarm-Mask” or “PMMASK” dialog box will eject as shown in the following figure. Please refer to that of 155Mbit/s system card for its

operation.





Trib- Mask

It includes two setting modes as shown in the following figure: configuration mode 1：click the items to be modified in pulldown menu of various items at each item below “Trib- Mask” and users can perform modifications. Configuration mode 2： click button in right side of “Trib- Mask” with mouse left key, then the Trib- Mask dialog box will eject as shown in the figure. At this time, users can choose

items for setting in Choice item inside left box. Then click to add them into Item to be modified in right boxes. Then input value to modify and click modification button “Modify”. After this, users can perform setting operation for selected items.

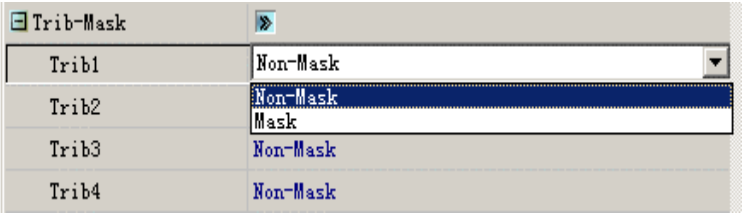


Figure 4-79 Configuration mode 1 of Trib- Mask

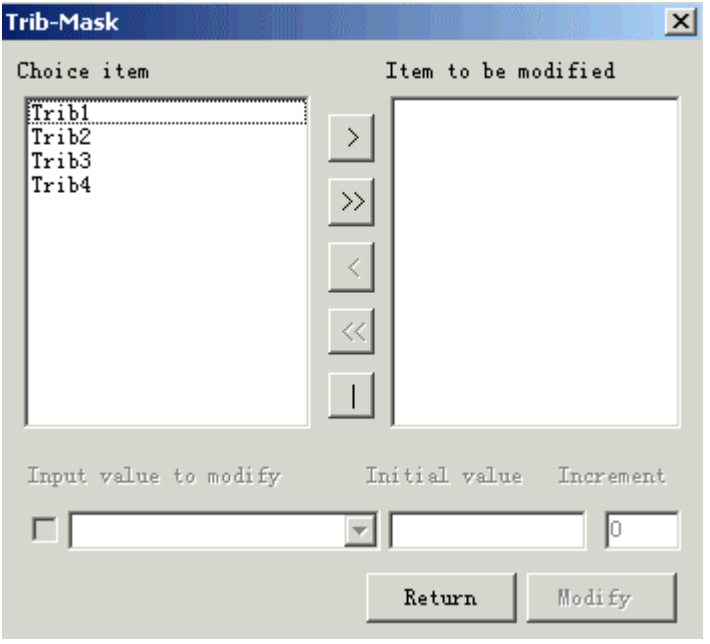


Figure 4-80 Configuration mode 2 of Trib- Mask

Trib- Switch

It has two setting modes, whose operation mode is similar to that of Trib- Mask setting.

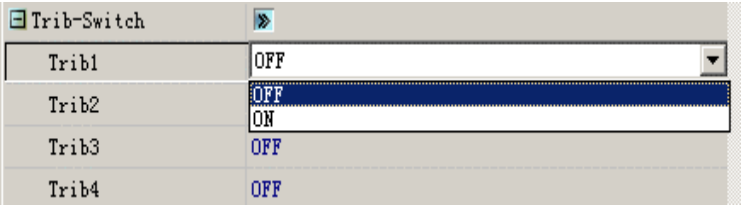


Figure 4-81 Trib- Switch setting

Trib- Mode- Set

It has two modes, whose operation mode is similar to that of Trib- Mask setting.

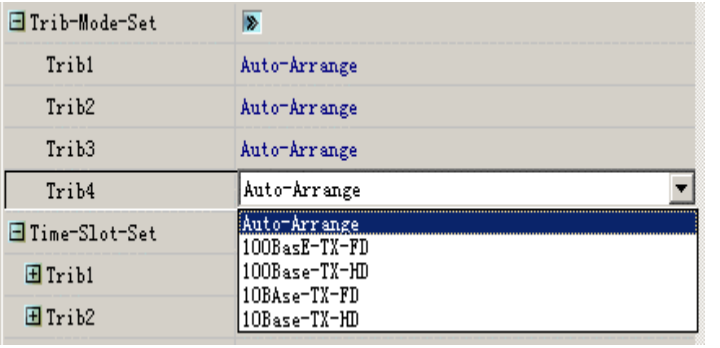


Figure 4-82 Trib- Mode- Set

Time- Slot -Set of tributary

It has two setting modes, whose operation mode is similar to that of Trib- Mask setting. It is used to configure time slots occupied by each Ethernet tributary interface under transparent transmission mode.

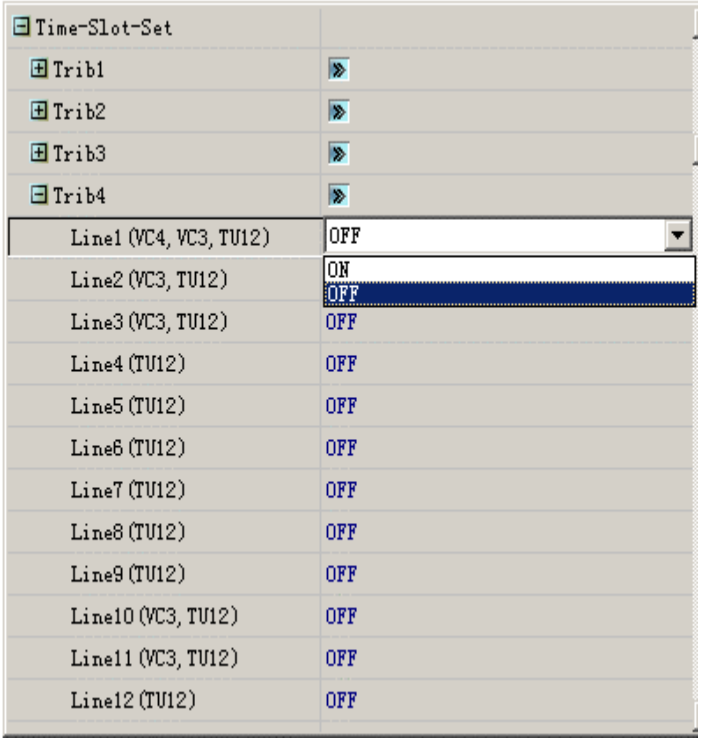


Figure 4-83 Time- Slot -Set of tributary

PM –Threshold- Set

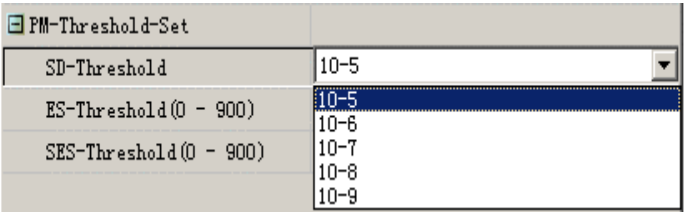


Figure 4-84 PM –Threshold- Set

4.5.2 Control Command

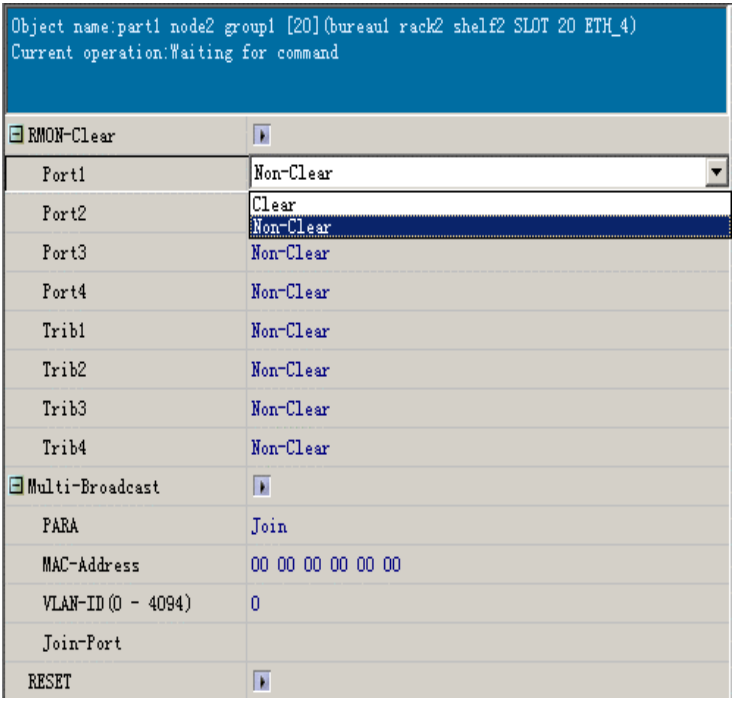
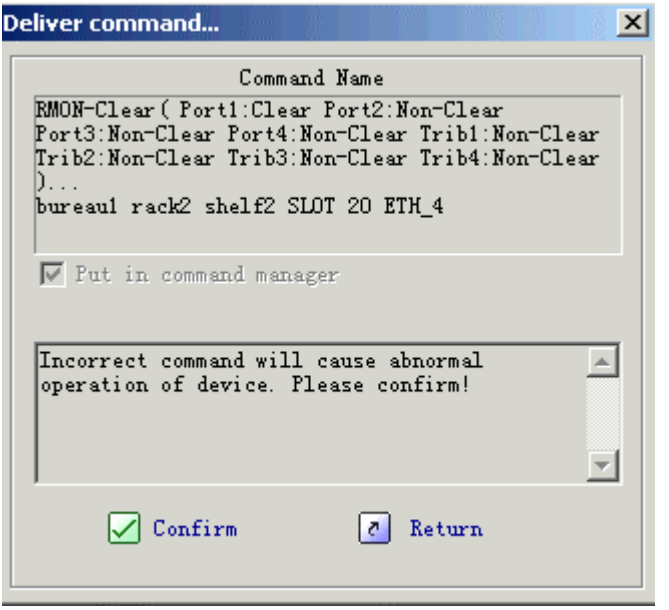


Figure 4-85 ETH4 card control command window

Select items to be given command in control command box,and click at right side of selective item with mouse left key. After Deliver command window ejects, users can click “confirm”. We take RMON-Clear as an example, as shown in the following figure.



4.6 2Mbit/s Interface Card（E1）

It is abbreviated as E1_32B in network management system.

4.6.1 Card Configuration

Basic configuration

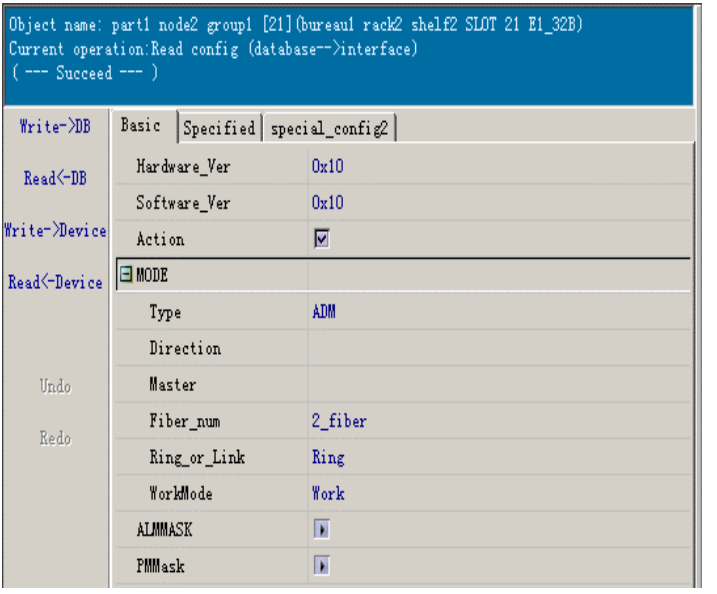
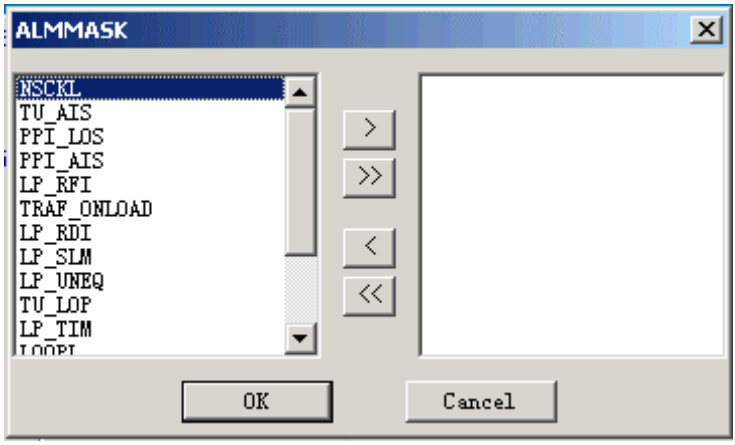


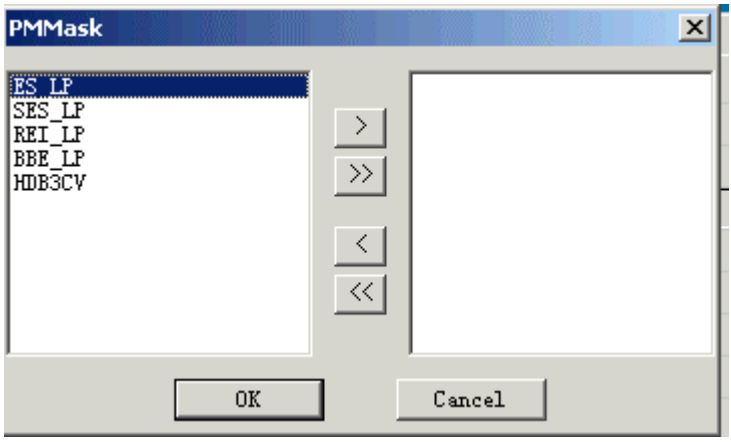
Figure 4-86 E1 card basic configuration window

Mode：Equipment includes ADM, TM, REG. It is often configured as ADM,and can be configured as TM when it acts as terminal.

ALMMASK and PMMask

Click spread buttor ▶ in right side of “ALMMASK”or”PMMask” ,and “ALMMASK”or”PMMask” dialog box will eject as shown in the following figure. The operation method can be referred to that of 155Mbit/s system card.


ALMMASK
NSCKL
TU_AIS
PPI_LOS
PPI_AIS
LP_RFI
TRAF_ONLOAD
LP_RDI
LP_SLM
LP_UNEQ
TU_LOP
LP_TIM
OK
Cancel


PMMask
ES_LP
SES_LP
REI_LP
BBE_LP
HDB3CV
OK
Cancel

Specified configuration

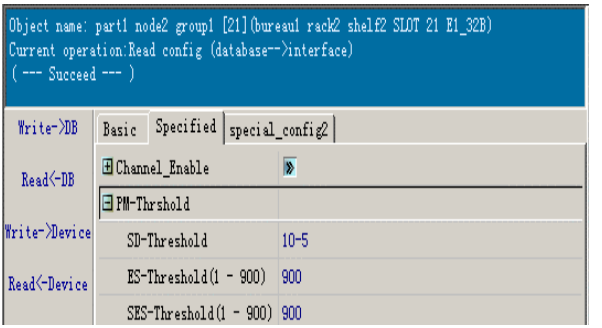


Figure 4-87 E1 card Specified configuration window

Channel -Enable

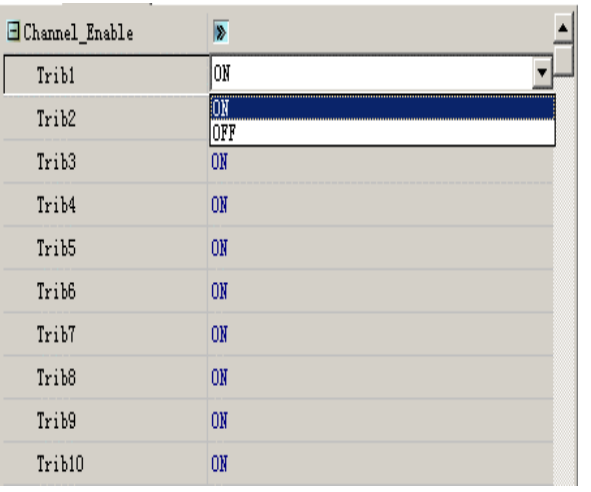


Figure 4-88 Channel -Enable setting

Special- config2

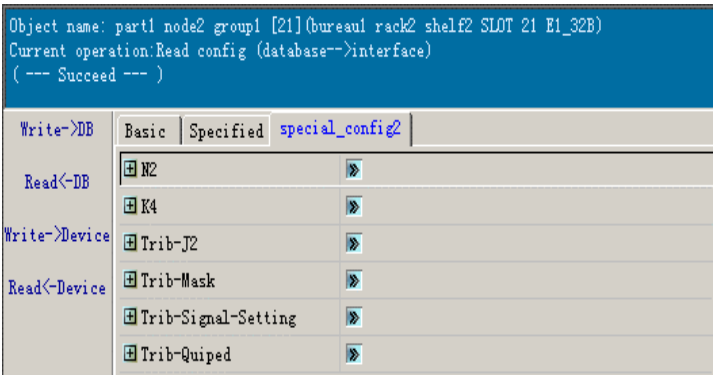


Figure 4-89 Special- config 2 window of E1 card

N2 configuration of tributary is as follows, and setting of other K4, J2 is similar to that.

Figure 4-90 Configuration mode 1 of (tributary) N2

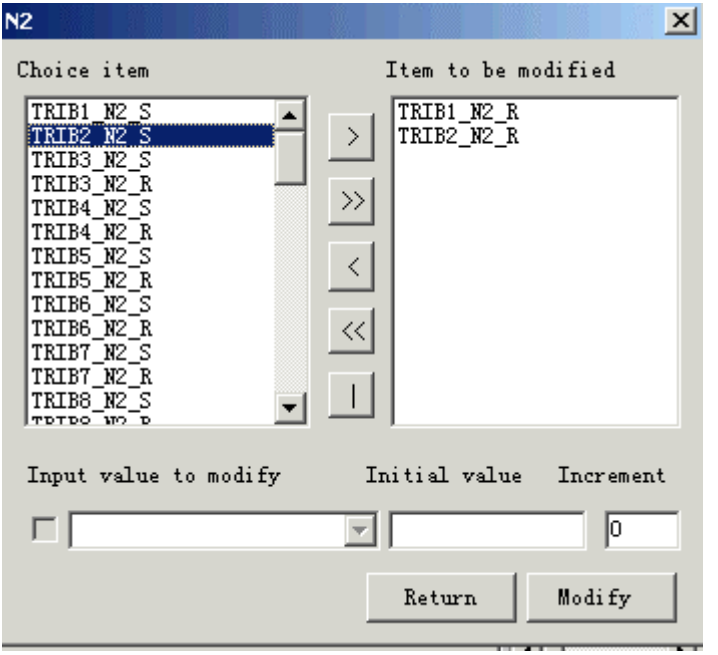


Figure 4-91 Configuration mode 2 of (tributary) N2

Trib- Mask

It has two setting modes, whose work mode is similar to that of (tributary) N2 setting.

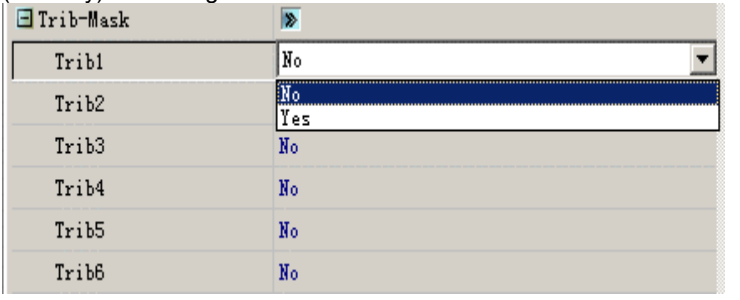


Figure 4-92 Trib- Mask setting

Trib- Signal- Setting

It has two modes, whose work mode is similar to that of (tributary) N2 setting.

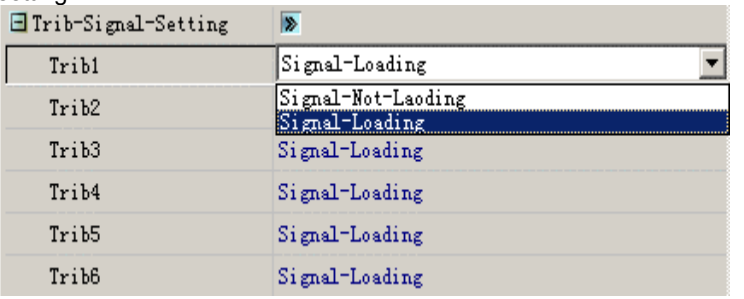


Figure 4-93 Trib- Signal- Setting

Trib- Quiped

It has two setting modes, whose working mode is similar to that of (tributary) N2 setting. This is used to configure service input of 2Mbit/s tributary interface. When it is configured as Operation-Devoted, it produces PPI-LOS alarm. When it is configured as Operation-Ready-Devote, PPI-LOS alarm is not produced. Equipment doesn't produce operation upload alarm until Operation-Devoted is checked. Then the tributary is changed to Operation-Devoted manually.

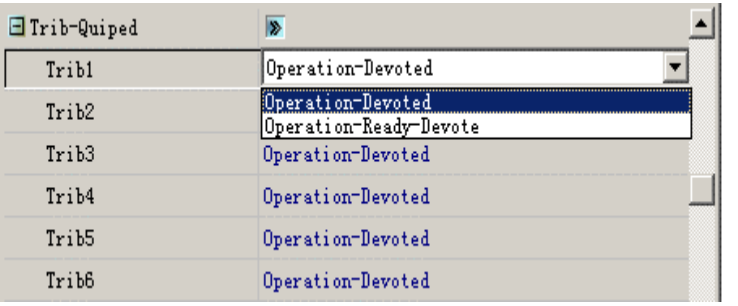
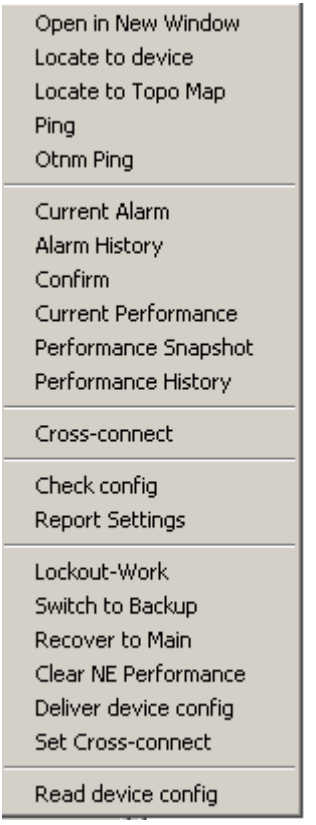


Figure 4-94 Trib- Quiped setting

5 Cross-Connect GUI

In this chapter, we only introduce IBAS cross-connect GUI briefly. As for detailed operation method, please refer to “e-Fim OTNM2000 V1.0 Transmission Network Sub-network Network Management System Operation Manual”.

Network node level network management cross-connect GUI of IBAS110A equipment：Click network node for cross configuration with mouse right key in “logic view” page. After shortcut menu ejects, select “Cross -connect” item and open cross configuration GUI. Or click network node for cross configuration with mouse right key in “network part view” page. After shortcut menu ejects, select “Cross -connect” item and open up cross-connect configuration GUI. The operation method is indicated as the following figure.


Open in New Window
Locate to device
Locate to Topo Map
Ping
Otnm Ping
Current Alarm
Alarm History
Confirm
Current Performance
Performance Snapshot
Performance History
Cross-connect
Check config
Report Settings
Lockout-Work
Switch to Backup
Recover to Main
Clear NE Performance
Deliver device config
Set Cross-connect
Read device config

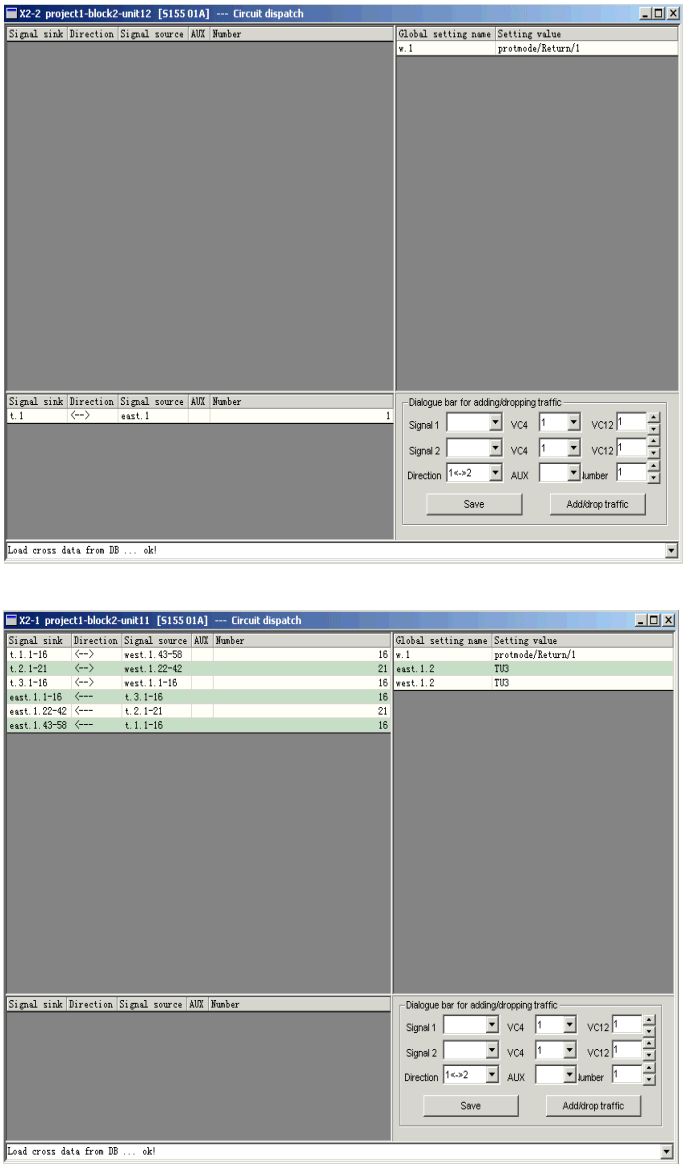


Figure 5-1 Cross-connect GUI of IBAS110A equipment

5.1 Cross-Connect Setting GUI and Description

This GUI is composed of 5 parts: low level cross setting list box, high level cross setting list box, add/drop input dialog box, global setting command list box, command row. This is shown as the following figure:

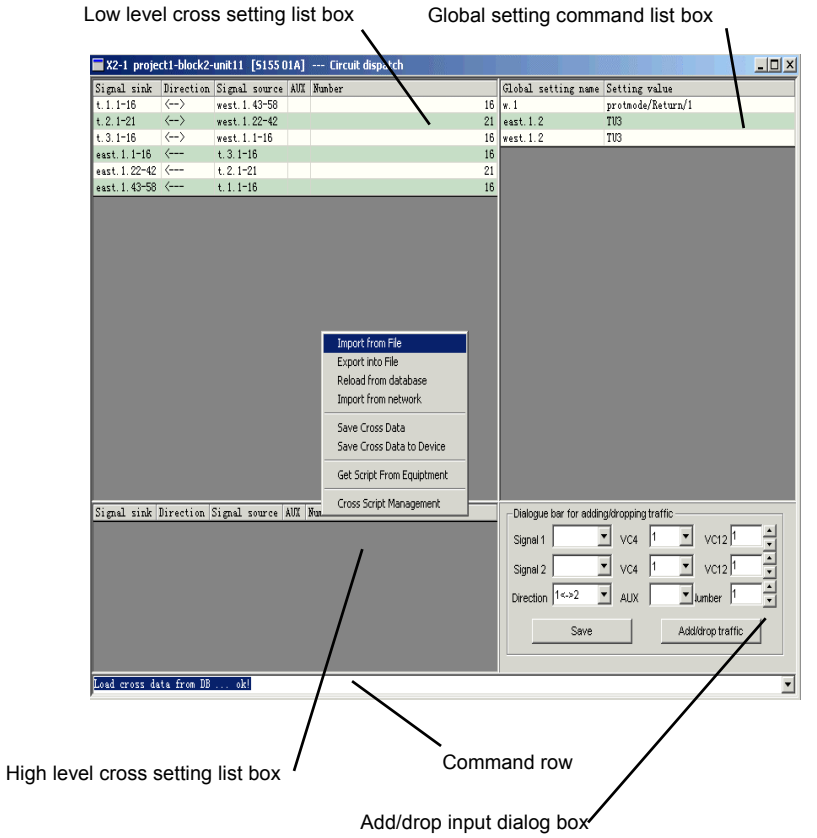


Figure 5-2 Cross-connect setting GUI 1

Low level cross setting list box

Signal sink	add circuit time slot
Direction	→or ← indicates single-direction,while ←→ indicates double-direction
Signal source	drop circuit time slot
AUX	It is the low level cross card to perform circuit dispatch. M indicates main cross card, while B indicates standby cross card
Number	total TU-12 time slot numbers of this add/drop circuit

High level cross setting list box

Signal sink	add circuit STM-1
Direction	→or ← indicates single-direction,while ←→ indicates double-direction
Signal source	drop circuit STM-1
AUX	It is the high level cross card to perform circuit dispatch. M indicates main cross card, while B indicates standby cross card
Number	Total STM-1 time slot numbers of this add/drop circuit

Add/drop input dialog box

Signal 1	from E（east）, or W（west）, or T（tributary）;
Signal 2	from E（east）, or W（west）, or T（tributary）;
Direction	1←→2 indicates double-direction,namely signal 1 and signal 2 are signal source and sink with each other;

1→2 indicates single-direction,namely signal 1 is signal source and signal 2 is signal sink;

1←2 indicates single -direction,namely signal 2 is signal source and signal 1 is signal sink;

AUX Main cross card（M）or standby cross card（B）is selected to perform circuit dispatch;

VC4 Select and fill high level start time slot from 1～48;

VC1 Select and fill low level start time slot from 1～63,while when high level cross is set, it should be filled with 0;

Number It is total TU-12 time slot numbers for low level cross configuration and total STM-1 numbers for high level cross configuration.

Note： “VC4”, “VC1”of first row belong to signal 1, and VC4”, “VC1”of second row belong to signal 2.

Add/drop traffic It is command button for cross configuration;

Save It is command button for saving cross configuration data into database.

Command row

It supports following commands, with contents inside square brackets indicating optional items：

add dest_oid [from source_oid] [/digitals /u /m /’]

add source_oid [to dest_oid] [/digitals /u /m /’]

It gives add/drop, which can be performed through add/drop input dialog box.

dest_oid: signal sink can be t,w,e,p,l

source_oid: signal source can be t,w,e,

e.g.： low level add：add e.1.1 from t.1.1/63

high level add：add e.2 to t.2

delete add：add t.2 /'

delete dest_oid [/digitals /u] （it can be replaced with add with /'）

It is used to delete add/drop.

e.g.： delete e.1.1/63

delete e.2

setcfg configname [/' /e /w]

It performs full setting.

settu3 OID [/']

It tells system whether one certain signal is or is not TU3 signal.

e.g.：sett w.3.1 //the first TUG3 in west 3 is a TU3 signal

sett t.2 //all TUG3s in the second tributary are TU3 signal

sett t.3/' //all TUG3s in the third tributary are not TU3 signal

setvc OID [/digitals /']

It tells system whether one certain signal is or is not TU3 signal or VC4 signal.

e.g.：setvc w.1 //the signal in the first west is a VC4 signal

setvc t.2.1 //the fist TUG3 in the second tributary is a TU3 signal

setvc e.1 //the signal in east.1 is a low level signal

setprotect OID [/digitals /']

It tells system whether certain aggression signals need protection.

e.g.： setp w.3.1 /12 //the first 12-TU12 of the third STM_1 needs protection

setp w.2 //all TU12s of the second STM_1 need protect

setp w.2/' //all TU12s of the second STM_1 need no protection

Global setting command list box

It lists and indicates global setting command.

Command selective item description

/digitals	It is digit standing for numbers（0-9）
/u	Single direction
/m	Main cross card
/’	It indicates “anti”, “no”, “delete”,”null”,etc.
/d	= /’
/east	East direction
/west	West direction

5.2 Common Steps for Cross-Connect Processing

When setting network node cross, users can input cross command through command row for setting or perform setting operation through selective items inside “add/drop input dialog box”.

1．Configuration of add/drop

e.g.：add t.1.1 to w.1.1 /12 （from t.1.1to w.1.1 add 12 2Ms can delete some signals through parameter /d,

e.g.：add t.1.1 to w.1.1 /2/d.

2．Tell system which channels transmit TU3 signal or VC4 signal.

e.g.：setvc t.1 (set t.1 as VC4 signal)

setvc w.1.1 (first TUG3 of w.1 is TU3 signal)

3．Tell system which channels need protection.

e.g.：setp t.1.1/8 (t.1.1～ t.1.8 needing protection)

4．Perform global setting.

e.g.：setc mirror (set hot backup of main –standby cross card)

setc aggpass (set auto configuration for aggregation –low level direct through,that is, for aggregation signal not to be added or dropped of this network node , default setting is low level direct through)

5. Save /generate configuration

   It switches cross information into card configuration to save it into database.

6. Deliver equipment configuration to network element

   Deliver equipment configuration of one certain network element to equipment to make data go into effect.

5.3 Cross-Connect Characteristics of IBAS110A Equipment

For “add/drop dialog box “ item inside IBAS110A cross GUI,if signal 1/ signal 2 is chosen as tributary（T）,the following 4 VC4s respectively are as follows ： ”VC4-1”represents extension tributary 1（corresponding to extension card 1）;”VC4-2” represents extension tributary 2（corresponding to extension card 2）;”VC4-3” represents system tributary 1（corresponding to S1P1-S1P16 2Mbit/s circuits of system card）; “VC4-4” represents system tributary 2（corresponding to S1P1-S1P16 2Mbit/s circuits of system card）.

If signal1/signal2 is chosen as aggregation（west or east）,the following VC4 can only select 1 for this equipment; that is, only the first VC4 is availability.

6 Equipment Performance Specification

This chapter mainly introduces performance specification of IBAS110A equipment. Main technical specifications of IBAS110A equipment meet to requirements of G.957, G.958, G.703, G783, G.823, G.825. This chapter manly includes the following aspects:

- STM-1/STM-4 optical interface performance specification
- 2Mbit/s electrical interface characteristic
- Jitter and shift performances
- Error performances

6.1 STM-1/STM-4 Optical Interface Performance Specification

This is shown as in Table 6-1, 6-2.

Table 6-1 STM-1 optical interface parameter index

Items		Unit	Value			
Interface type			STM-1			
Nominal bit rate		kbit/s	155520			
Application sort code			S-1.1	L-1.1		L-1.2
Application distance range(without amplifier)			0-50Km	30-60Km		60-90
Operation wavelength range		Nm	1261-1361	1261-1361		1480-1580
S point characteristic of transmission equipment	Optical source type		MLM	MLM	SLM	SLM
	Maximum rms spectrum width (σ)	nm	7.7	4	-	-
	Maximum -20dB spectrum width	nm	-	-	1	1
	Minimum edge-mode suppressing ratio	dB	-	-	30	30
	Maximum average transmitting power	dBm	-8	0		1
	Minimum average transmitting power	dBm	-15	-5		-4
	Minimum extinction ratio	dB	8.2	10		10
S,R Point channel characteristic	Attenuation range	dB	0-12	10-28		10-28
	Maximum dispersion	ps/nm	96	185	NA	NA
	Minimum return loss of optical cables at S (including any moving connector)	dB	NA	NA		NA

	Maximum dispersed reflection coefficient at S and R	dB	NA	NA	NA
R point characteristic of receiver	Minimum sensitivity (BER≤10-10)	dBm	-31	-37	-37
	Minimum overload(BER≤10-10)	dBm	-8	-10	-10
	Maximum optical channel cost	dB	1	1	1
	Maximum reflection coefficient of receiver at R	dB	NA	NA	**NA**

Note ： NA indicates no special requirement.

Table 6-2 STM-4 optical interface parameter index

Item		Unit	Value			
Interface type			STM-4			
Nominal bit rate		kbit/s	622080			
Application sort code			S-4.1	L-4.1	L-4.2	L-4.3
Application distance range			0-30	30-45	30-70	30-70
Operation wavelength range		nm	1274-1356	1296-1330	1480-1580	1480-1580
Characteristic of transmission equipment at S	Optical source type		MLM	MLM	SLM	SLM
	Maximum rms spectrum width (σ)	nm	2.5	1.7	-	-
	Maximum -20dB spectrum width	nm	-	-	<1	1
	Minimum edge-mode suppressing ratio	dB	-	-	30	30
	Maximum average transmitting power	dBm	-8	2	2	2
	Minimum average transmitting power	dBm	-15	-3	-3	-3
	Minimum extinction ratio	dB	8.2	10	10	10
Channel Characteristic of S,R	Attenuation range	dB	0-12	10-24	10-24	10-24
	Maximum dispersion	ps/nm	74	109	1840	NA
	Minimum return loss of optical cables at S (including any moving connector)	dB	NA	20	24	20
	Maximum dispersed reflection coefficient at S and R	dB	NA	-25	-27	-25
Characteristic of receiver at R	Minimum sensitivity (BER≤10-10)	dBm	-28	-28	-28	-28
	Maximum overload (BER≤10-10)	dBm	-8	-8	-8	-8
	Maximum optical channel cost	dB	1	1	1	1
	Maximum reflection coefficient of receiver at R	dB	-27	-14	-27	-14

6.2 2Mbit/s Electrical Interface Characteristic

2Mbit/s interface and output specification of IBAS110A equipment is indicated as in Table 6-3 and 6-4.

Table 6-3 2Mbit/s input interface specification

Contents	2Mbit/s interface
Transmission code type	HDB3
Bit rate	2048kbit/s
Allowable deviation	±50ppm
Input impedence	75Ω(unblanced)/120Ω(balanced)
Return loss (dB)	In the following range (2.5%～5%)f0≥12 (5%～100%)f0≥18 (100%～150%)f0≥14
Input allowable attenuation	0～6dB(1024KHz)

Note：1ppm=1×10-6 . f0 is nominal bit rate.

Table 6-4 2Mbit/s output interface specification

Contents	2Mbit/s interface	
Number of pairs in each direction	One coaxial pair	One symmetric pair
Tested load impedance	75Ω, resistive	120Ω, resistive
Nominal peak voltage of mark pulse	2.37V	3V
Nominal peak voltage of space pulse	0± 0.237V	0±0.3V
Nominal pulse width	244ns	
Amplitude ratio of positive and negative pulses in the middle of pulse persistence	0.95 to 1.05	
Width ratio of positive and negative pulses at the nominal half amplitude	0.95 to 1.05	
Maximum output jitter at output	Meeting requirements of G.823	

6.3 Jitter and Wander Performance

- Jitter and wander tolerance of STM-1/STM-4 interfaces

  STM-1/STM-4 input interface should be able to endure input jitter and wander as shown in the templet of Figure 6-1.

  The parameter value can refer to Table 6-5.

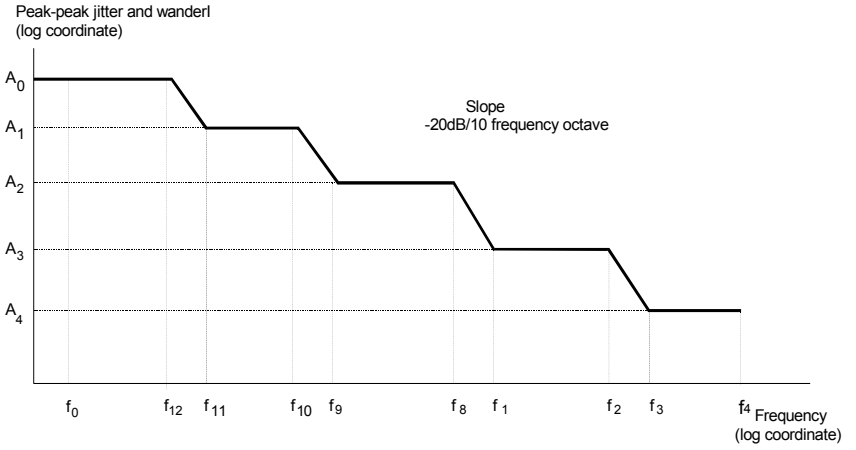


Figure 6-1 Jitter and wander tolerance of STM-1/STM-4 interfaces

Table 6-5 Jitter and wander tolerance parameter of STM-1/STM-4 input interface

	Reference point	STM-1	STM-4
UIp-p	A0(18μs)	2800	11200
	A1(2μs)	311	1244
	A2(0.25μs)	39	156
	A3	1.5	1.5
	A4	0.15	0.15
Frequency	f0	1.2×10-5Hz	1.2×10-5Hz
	f12	1.78×10-4Hz	1.78×10-4Hz
	f11	1.6×10-3Hz	1.6×10-3Hz
Frequency	f10	1.56×10-2Hz	1.56×10-2Hz
	f9	0.125Hz	0.125Hz
	f8	19.3Hz	9.65Hz
	f1	500Hz	1000Hz
	f2	6.5kHz	25kHz
	f3	65kHz	250kHz
	f4	1.3MHz	5MHz

- Output jitter of STM-1/STM-4 interface

  Without input jitter, this equipment's output jitter peak-peak value accords with Table 6-6 at STM-1/STM-4 interface.

Table 6-6 Jitter generation specifications at STM-1/ STM -4 interface

Interface	Testing filter	Peak-peak jitter
STM-1/STM-4	500H to 1.3MHz	0.50UI
	65kHz to 1.3MHz	0.10UI

- Jitter and wander tolerance of 2Mbit/s input interface

  2Mbit/s input interface should be able to endure input jitter and wander as shown in the templet of Figure 6-2. The parameter values are shown as in Table 6-6.

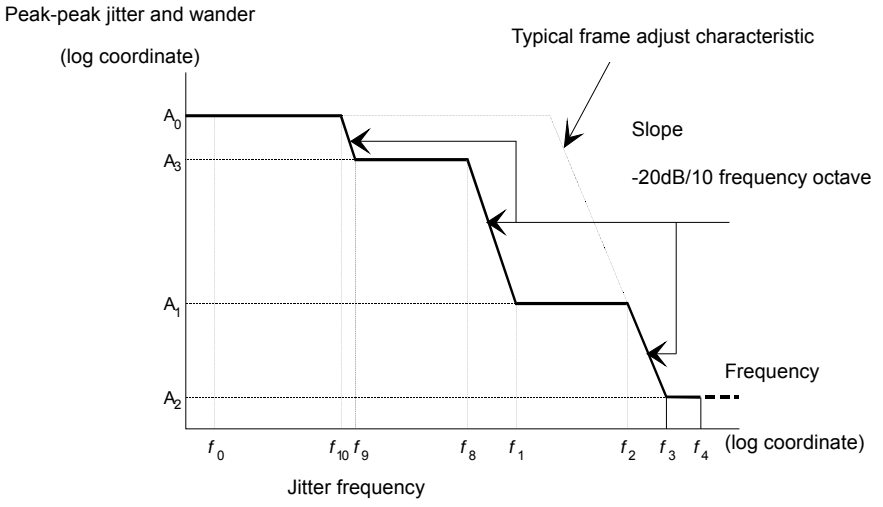


Figure 6-2 Jitter and wander tolerance of 2Mbit/s input interface

Table 6-7 Jitter and wander tolerance parameter of 2Mbit/s input interface

	Referenece point	Value
UIp-p	A0(18μs)	36.9
	A1	1.5
	A2	0.2
	A3	18
Frequency	f0	1.2×10-5Hz
	f1	20Hz
	f2	2.4kHz
	f3	18kHz
	f4	100kHz

- Wander value of 2Mbit/s output interface

  Wander value of 2Mbit/s output interface should not exceed that of 2Mbit/s interface. The measuring configuration is as Figure 6-3,with filter frequency decreasing according to 20dB/10 frequency octave.

Table 6-8 Output wander of 2Mbit/s interface

Rate(kbit/s)	Maximum output jitter of digital section		Parameter of testing filter		
	B1 UIp-p	B2 UIp-p	f1	f3	f4
2048	1.5	0.2	20Hz	18kHz	100kHz

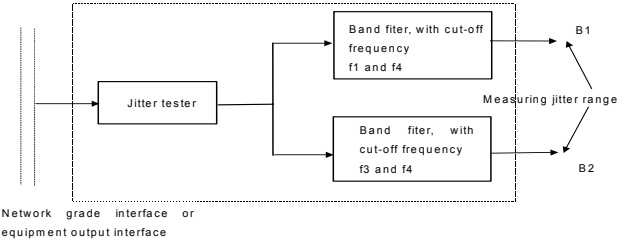

Band fiter, with cut-off frequency f1 and f4
B1
Jitter tester
Measuring jitter range
Band fiter, with cut-off frequency f3 and f4
B2
Network grade interface or equipment output interface

Figure 6-3 Measure configuration of 2Mbit/s output jitter

- Combination jitter

  Combination jitter of SDH equipment is the jitter that is generated at PDH tributary output interface under combination affection of tributary map and pointer adjustment. The given values are only jitter peak-peak values in given time periods under special adjustment sequence functions. The indexes of combination jitter are indicated as in Table 6-9.

Table 6-9 Combination jitter index

G.703 interface (kbit/s)	Bit rate tolerance range (ppm)	Maximum peak-peak value of combination jitter (UIP-P)								Test sequence parameter		
		f1～f4(B1)				f1～f4(B2)				T1	T2	T3
		20Hz-100kHz				18kHz-100kHz				s	ms	ms
2048	±50	0.40	0.40	0.40		0.075	0.075	0.075		⩾10	⩾750	2
Test sequence		a	b	c	d	a	b	c	d			

- Map jitter

  The map jitter of SDH equipment is jitter from output interface without pointer function (adjustment) at equipment demultiplex side. The indexes of map jitter are shown as in Table 6-10.

Table 6-10 Map jitter indexes

G.703 interface (kbit/s)	Bit rate tolerance range (ppm)	Filter characteristic			Map jitter Maximum peak-peak value (UI)	
		f1 (Hz)	f3 (kHz)	f4 (kHz)		
		High traffic	High traffic	Low traffic	f1～f4	f3～f4
2048	±50	20 -20dB/dec	18 -20dB/dec	100 -20dB/dec	0.40(Interim)	0.075

6.4 Error Performance

This equipment can operate “error-free”, that is, when equipment is operating under designed conditions and no error is detected from not less than (3~5)×10X bits, probability of BER⩽1×10-X (X⩾12) can be larger than (95~99)%.

7 Equipment Maintenance

"Maintenance" generally refers to communication system maintenance. It's not only limited to this equipment, but also includes lines, circuits, external terminal equipment and auxiliary setting.This chapter mainly includes the following contents：

- Equipment daily maintenance
- Analysis of constant fault
- Troubleshooting

7.1 Equipment Daily Maintenance

7.1.1 Precautions of Equipment Maintenance

- Judgement and processing of system fault： Use network management system and self alarm indication to judge and find faults. Take correct measures for processing faults and restore circuits in shortest time.
- Guarantee good equipment operation conditions, especially power feeding quality which are bases for normal system operation. Good other environment conditions are prerequisite for long equipment lifetime and low fault rate.
- No need for daily adjustment and test. Many maintenance rules for analog equipment don't apply to digital equipment. This equipment only needs regular precautionary monitoring, instead of precautionary debugging. Do not check equipment if no obvious fault happens in level to avoid man-made faults.

- The main means of circuit fault processing is to replace faulty cards. Certain quantity and kinds of spare cards shall be available. Because of card high integration, high assembly density and circuit complexity, it's of little possibility for users to repair faulty cards. It's recommended to return all faulty cards to factory for repair.
- Network management system can monitor real time performance without terminating traffic. It can also monitor faults, judge fault type and find fault location. Therefore, it's an effective tool for preventive maintenance and fault processing.
- This equipment is of precision type. When operating this equipment, users should pay attention to force degree. No rough operation or violent plugging in or out is allowed.
- Under common conditions, it not allowed to bend fibers. If necessary, the bending radius should not be less than 38mm. Do not open the removable fiber connector unnecessarily. If necessary to open for equipment maintenance, protection measures should be taken to avoid contamination on the end face of connector.

7.1.2 Equipment Daily Maintenance

Equipment daily maintenance is the maintenance item that must be carried out every day. It helps users to realize equipment operation status in real time to find and solve corresponding problems in time. The discovered problems during daily maintenance operation must be recorded in detail to carry out maintenance and get rid of hidden trouble in time.

Daily maintenance includes the following items:

- Check on equipment voice alarm

  During daily maintenance, voice alarm of equipment is usually easier to arose notice of maintenance personnel than other alarms. So users must maintain connection of this alarm source during daily maintenance.

- Observation of equipment LED

  Equipment maintenance personnel mainly obtains alarm information from alarm LEDs. So they should pay attention to their twinkle status during daily maintenance. From this aspect, users can make judgement on whether equipment works normally in accidence.

- Check on temperature and humidity

  The range for guaranteeing performance of equipment is as follows：

  Temperature： +0 ~ 45℃ (+5～40℃ being guarantee index)

  Humidity： ≤85%（+30℃）

  If temperature or humidity exceeds the above range, normal operation of equipment shall be affected. So equipment maintenance personnel should often check temperature and humidity of equipment.

- Check and regular clean of fan

  Good heating dispersion is a key factor to ensure lasting normal running of equipment. So users need to check operation and aeration status of fan regular.

7.2 Analysis of Constant Fault

SPI-LOS

- Alarm name

  SDH physical layer signal loss

- Alarm type

  Urgent alarm

- Alarm cause：

  1. Probably optical cable or pigtail connected with this equipment is broken, or movable connector has bad touch.
  2. Probably the receiving optical power is ultra big or small and exceeds receiver overload point or is below receiver sensitivity.
  3. Probably laser of opposite end optical card is shattered and “receiving no light” occurs, or local end optical receive module is shattered so that equipment cannot receive optical power.

- Common processing methods

  When this alarm occurs, users had better measure receive optical power at line receive end with optical power meters. If optical power cannot be measured, it is probably because optical fiber is broken or opposite rend transmission is bad. If optical power is measured, users need to measure optical power at optical receive card. Users can use this method to find alarm fault points have fiber-broken, opposite optical transmission shattered, optical connectors not clean or local end fault. Then users can perform fault processing and elimination according to actual conditions.

RS-LOF, RS-OOF

- Alarm name

  Regeneration section loss of frame, regeneration section loss of alignment.

- Alarm types

  Urgent alarm

- Alarm cause

  1. Probably local end receives or opposite end optical card transmits abnormal optical signals.
  2. Probably quality of optical cable or pigtail decreases, or end face of optical connector is not clean. Other probabilities include: optical spoilage increases so that received optical power decreases; input optical signal extent decreases（below provision value or signal shattering）;
  3. Probably receive optical powers ultra big or small, or receiver receives optical power that is below its sensitivity or exceeds its dynamic range.

- Common processing methods

  When this alarm occurs, users had better measure receive optical power at line receive end, for example, at ODF rack, with optical power meters. Users also can measure optical power at optical receive card. Users can use this method to find alarm fault points have fiber-broken, opposite optical transmission shattered, optical connectors not clean or local end fault. Then users can perform fault processing and elimination according to actual conditions.

MS-AIS

- Alarm name

  Multiplex section AIS alarm

- Alarm type

  Non-urgent alarm

- Alarm cause

  When upstream regeneration equipment occurs signal transmission failure (SPI-LOS, RS-LOF or serious error, etc.),equipment shall give alarm indication AIS signal to downstream direction.

- Common processing methods

  This alarm is commonly generated from bad receive status in upstream, so users should deal with faults on upstream stations.

AU-AIS

- Alarm name

  Management unit AIS alarm

- Alarm type

  Non-urgent alarm

- Alarm cause

  When upstream equipment occurs signal transmission failure,this equipment shall give alarm indication AIS signal to downstream direction.

- Common processing method

  Users should deal with signal transmission failure faults on upstream stations first. Only after this operation, can local end AU-AIS alarm be eliminated.

AU-LOP

- Alarm name

  Management unit loss of pointer

- Alarm type

  Urgent alarm

- Alarm cause

  1. When H1,H2 overhead bytes of AU pointer at aggregation side have errors with themselves, this alarm can happen.
  2. Also probably optical connector is not clean so that receive optical powers out of normal range.
  3. Also probably certain faults exist in optical circuit part.

- Common processing method

  Users can make line or equipment loopback in optical circuit to find fault point that has alarm, and carry out troubleshooting operation.

  If optical circuit has fault, please change optical card.

HP-TIM

- Alarm name

  High level channel trace identify mismatch

- Alarm type

  Urgent alarm

- Alarm cause

  1. Probably there is error with J1 byte of high level channel trace identify.
  2. Equipment has shut-off of power.

- Common processing method

  1. Users can make line or equipment loopback in optical circuit to find fault point that has alarm, and then carry out

troubleshooting operation;

2. If optical circuit has fault, please change optical card.

HP-SLM

- Alarm name

  High level channel signal label mismatch

- Alarm type

  Urgent alarm

- Alarm cause

  Probably C2 byte is not configured or has configuration error.

- Common processing method

  1. Users should configure C2 bytes received at card and transmitted from opposite end to be of same mode according to connected interface circuit.

  2. For newly start-up equipment, if this alarm occurs, users should check whether C2 bytes of opposite end equipment have been dealt with.

HP-LOM

- Alarm name

  High channel loss of frame

- Alarm type

  Non-urgent alarm

- Alarm cause

  Continuity bit error also can cause this error.

- Common processing method

  Users can make line or equipment loopback in aggregation side to find whether fault station is at opposite end or local end .

7.3 Troubleshooting

After aborative installation and test by technical personnel during project installation, IBAS110A equipment commonly can be operated normally with stabilization. But for multiple reasons, for example, infection from system external circumstance, aging and shattering of some devices, wrong operation during maintenance, etc., IBAS110A equipment may run abnormally. At this time, technical personnel need to correctly analyze, locate and eliminate fault of equipment to make system resume normal status rapidly.

7.3.1 Troubleshooting Flow

Basic troubleshooting flow is as the following figure:

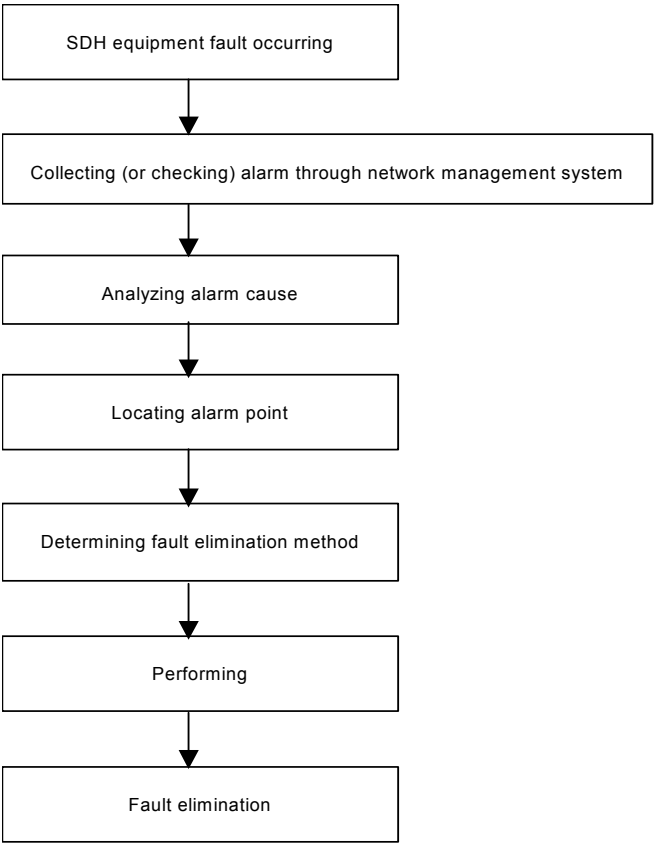


Figure 7-1 Troubleshooting flow

The key in troubleshooting flow shown as Figure 7-1 is locating alarm point,while for locating alarm point, it is most important to locate fault point accurately to station.

For application characteristics of transmission equipment---long distance between stations, it is of ultra importance and key to locate fault point to station for fault location. If users guess the fault station or fault board in blindness, this usually only leads to delay of solving problems. As soon as fault station is confirmed, we can centralize

vigour and eliminate the fault through methods such as data analysis, hardware check and board change, etc.

7.3.2 Thought of Alarm Point Location

When locating alarm point, technical personnel can perform estimation according to the following thought：

Excluding equipment external fault

Before fault location of transmission equipment, external faults should be first excluded. These external faults include: grounding, optical fiber, trunk line, exchange, power source , etc.

Locating fault to station

For fault location, it is most important to locate fault point accurately to station. For locating fault to station, the most widely used method is “loopback method”. That is, through outer and internal loopback to optical card station by station, to find and locate probable fault station or optical card. In addition, alarm performance analysis method is also often used. Commonly, if these two methods are used together, users can locate fault to station.

Locating fault to card for elimination

After locating fault to one certain station, users mostly uses replacement method to carry out further location for fault. Through card replacement, the cards with faults can be found out. In addition, configuration change method, configuration data analysis method and experience method are also methods in common use and good availability for solving station problems.

7.3.3 Card Replacement

IBAS110A equipment is of 2U structure,including two parts: system cards and extension cards. When main board has faults, we suggested that it be replaced in site by FiberHome technical personnel or it be fully replaced. When inserted cards have faults, users can replace them according to the following steps:

- Find corresponding standby cards;
- Put on anti-static wrist strap and shut off power;
- Pull out fault cards carefully;
- Insert standby cards;
- Switch on power and observe operation status of equipment;
- Send the fault cards back to FiberHome for repair as soon as possible.

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